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How has environmental violence been experienced during the Cape Town water crisis using the Newlands Spring as a case-study.

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Plagiarism Declaration

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Abstract

Four million residents of a major modern city faced the very likely existential and physical threat of running out of water. The water crisis continues to be an extremely complex threat with many complicated aspects to the drought, which resulted in residents of Cape Town reacting with intensity to this danger. The crisis is an example of how ignoring environmental issues can lead to catastrophic outcomes for society. For South Africa, which is characterized by a turbulent history, Homer-Dixon (1999) predicted there would be violent conflict in the future over resource scarcities. The drought was not a shock, it was a stress; what the drought fashioned were instances of shock which mostly related to the media campaign for Day Zero. Although no violent conflict on a mass scale has transpired as a result of the ongoing water crisis, there have been cases of civil violence. From protests at the greater Cape Town scale to physical altercations witnessed at Newlands Spring, the results of the present study demonstrate that mass violent conflict is not a far-off consequence of water scarcity. This research aimed to determine whether environmental violence was a lived experience for the residents of Cape Town due to the water crisis. One of the objectives was to understand whether the water crisis-induced feeling of distress and anxiety and whether indicators of slow violence and "Solastalgia" could be identified; a concept put forth to provide clarity to distresses which are environmentally caused (Albrecht *et al.,* 2007; Higginbotham *et al.,* 2007). Over the course of October 2018, semi-structured interviews were conducted with security and informal workers and a public survey was conducted with 100 residents who collect water at the Newlands Spring. The outcomes observed in this research is that when people feel as though their security is threatened, people tend to respond violently to the scarcity of a vital resource. The key finding of this study is that environmental violence was experienced over the crisis period. This leads to the conclusion that Solastalgia was likely to be experienced by those engaging within this Newlands Spring environment and elsewhere. The Structural violence and Supply induced violence have meant that people across South Africa experience water crises of different scales. Climate change is to aggravate these existing forms of violence and produce more complex psychological, social and economic impacts on those affected by water scarcity. Furthermore, this research contributes to the knowledge that droughts and water scarcity pose immeasurable threats to humanity.

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Chapter 1

The water crisis that nearly crippled the city.

All over the blue planet, even in the most rained-upon nations, people are engaged in conflicts over water. There are debates about who should own it, manage it, have access to it, profit from it, control it or regulate it. Nothing on earth, not even land, is more contested (Strang, 2004).

The availability and access to water is one of the most pressing issues in the 21st Century and climate change will most certainly exacerbate these issues immensely (Steffen, Crutzen and McNeill, 2007; Rockström *et al.,* 2009 and Mehta, 2011). This most precious life-sustaining resource is under threat as a large portion of South Africa's water resources have been degraded and depleted over the past few decades. Both land and aquatic environments have seen tremendous changes to their ecological functioning; threatening the efficiency of natural regenerative cycles. Even though water is a human right, it is not necessarily granted (Mehta, 2011). The residents of the City of Cape Town have come to know this when they faced city-wide water restrictions with the danger of city-wide water cut off due to the incredibly severe drought that resulted from three years of below average rainfall. Access to water and other resources has long been contested in this city, as the racial discrimination and imposed segregation that was enforced by law during Apartheid left long-lasting effects on the residents of this city. The coloured and black population have been the most severely impacted by the institutionalized inequality and their access to services, quality of these services and their delivery has been inadequate. Furthermore, connectedness to nature and access to natural resources, such as the Newlands Spring, has become a luxury to the few who live in closer proximity to the remaining pockets of nature in the city, mostly the middle to upper white class. Considering the varying levels of inequality and disparity in this city across racial and class divides, the risk of no water was a threat to national security. The drastic change to societal functioning as a result of no water thankfully remains within the imagination of Capetonians for now but this reality nearly did plagued disaster to this Metropolitan tourist destination (Wolski, 2017 a; Isaacs, 2018).

This study focuses on the recent ongoing water crisis, with peaks occurring in the last two years (2017 and 2018) that took place in the City of Cape Town in the Western Cape, South Africa; where the city faced the threatening and real prospect of running out of water (termed Day Zero). Cape Town narrowly avoided becoming the first coastal city in the world to be in this predicament. This study focused on the how the scarcity of water, caused by both a structural scarcity, as there was no supply of rain and the largest dam reached 11% capacity, and supply induced as there was a shortage of water. This water scarcity caused citizens to scramble for water to ensure their own reserves, react

violently when feeling their security threatened, experience high levels of distress whilst simultaneously identifying with the desperate need to save water.

It seems that the future of the planet and its ability to provide the services which have created conditions viable for human existence has become compromised by human-driven changes to the local and global environment and systems (Steffen, Crutzen and McNeill, 2007). These changes may be detrimental to human well-being and our existence (Rockström *et al.,* 2009). Evidence for the transformation in the relationship between humans and the rest of nature can be seen in our behaviour to and within all environments. Human beings have become a geological agent forcing the planet out of its previous geological epoch, the Holocene, where the climatic conditions were suitable for humankind, into the new unprecedented era; the Anthropocene. The Anthropocene is viewed as the period during which human activity has been the dominant influence on the climate and environment (Steffen, Crutzen and McNeill, 2007; Cornell, 2014). Climate change is linked to the exponential increase of CO^2 released into the atmosphere through anthropogenic activities such as farming, deforestation, urbanization and burning of fossil fuels (Bonneuil and Fressoz, 2016). Due to this shift, the future of the world is predicted to be warmer overall, have less forest and vegetation cover, become less biologically diverse and with various regions expected to become wetter and stormier (Steffen, Crutzen, and McNeill, 2007; Rockström *et al.,* 2009; Cornell, 2014). As a result, natural disasters such as droughts and floods are expected to increase in frequency, duration, and intensity in the future for South Africa. These natural disasters will have a long-lasting impact physically, psychologically and financially (Higginbotham *et al.,* 2007). These disasters will challenge governmental, municipal and city responses; simultaneously calling for more sustainable modifications to the infrastructural, social, financial and physical responses to these foreseen crises.

The City of Cape Town, however, is not the only city in the world to face this kind of threat; Mexico City, Jakarta, Istanbul, London, and Tokyo are all major cities that will face similar struggles in the next decade (Schapitl, 2018). After three years of lower than average rainfall, the Theewaterskloof dam, one of Cape Town's largest water sources for drinking and farm irrigation became the symbol for the water crisis (Walton, 2018). Human-induced climate change has contributed to the severity of this current drought with droughts of a similar nature predicted in the future (Wolski, 2017; Wolski, Hewitson and Jack, 2018). Meteorological conditions are not the only factors that lead to this crisis; despite being aware of the vulnerability of the water, the supply system expansion did not occur at the planned date, leaving an unexpected crisis such as this one to become devastating (Muller, 2018; Green, 2019). Although the crisis was unexpected by many of the residents of Cape Town, mainly due

to a poor understanding of the severity of the drought and initially poor communication by the government; it was not an unexpected outcome of this irresponsible water management. It had been predicted for years that the practicing water management strategy was not effective and so a crisis of this magnitude was bound to occur. The Department of Water and Sanitation stated that by 2015 the Cape Town water supply would need to be reviewed and supplementary sources added to the supply network to meet projected population demands (Olivier, 2017). This, however, was not done and consequently, the dynamics between supply and demand was unstable. The availability of water is a concern for South Africa as it is classified as a water-scarce country that experiences high levels of water loss due to evaporation. The Western Cape province is subsequently described as a water-scarce region, receiving less than 700mm of rainfall a year (Walton, 2018). Furthermore, this area records very high levels of climate unpredictability, especially with year-to-year variability. The added vulnerability of this region is that it is highly dependent on surface-level resources which are prone to this high degree of evaporation (Wolski, Hewitson and Jack, 2018). With climate projections showing the Western Cape becoming warmer and drier, these resources are becoming increasingly exposed. Thus, as put forth by Wolski, (2017); Wolski, Hewitson, and Jack, (2018) and concluded by Walton (2018), what this drought revealed was the incapacity of the system to cope with droughts of this magnitude. Hence, the drought was not a shock but rather a stress on an already failing system.

Country-wide the conditions of water scarcity pose a threat to agricultural and economic productivity, aquatic environments and national security; the ecological services we receive from nature are entering or have passed severe regime shifts. As was the situation in the Western Cape, cultural bonds connected to water were at risk from the demands between different sectors, triggering tensions between the various users, as the supply of water decreased. Despite this bio-physical lack of rainfall along with high levels of evaporation and upon deeper investigation of rainfall records for the Western Cape, Blamey *et al.,* (2018) discovered a anomalously far south shift in both the jet stream and the South Atlantic Anticyclone (which is a high-pressure system found in the subtropical South Atlantic Ocean). These three factors brought on the drought conditions. Mismanagement of water resources and unmaintained infrastructure have had an equally, if not more, severe impact on water availability.

Now that more than half of the global population lives in urban areas, the Earth's water dilemmas are acknowledged by many experts to be caused by centuries of mismanagement rather than just the factor of scarcity (Barrett, 2015; Guckenberger, 2018; Green, 2019). This is true for the Western Cape crisis as well as the ongoing but less publicized droughts of the Eastern and Northern Capes. Water

mismanagement arises from different levels of politics and the culpability for the crisis in Cape Town is still up for debate (Guckenberger, 2018).

The decline in public services and the mismanagement of water and electricity affects most South African residents. The discrepancy between services promised and not delivered by the government has resulted in public service protests, trade union protests, *Fees must Fall* protests to xenophobic attacks, all of which have resulted in conflict. A conflict situation occurs when two or more actors have competing interests and expectations. If service delivery discrepancies cannot be resolved this may lead to mutual losses and may encourage either or both actors to result in extreme actions, such as the use of violence (Scheffram *et al.,* 2014). Due to these multidimensional uses and perceptions of water by various water users and sectors, the possibility of a disagreement regarding water supply and management to occur is very likely. This situation is aggravated by already existing social cleavages matched with a history of violent conflict, structural violence, unmaintained infrastructure and inadequacy of government and municipal capacity.

Homer-Dixon (1999), Nixon (2011) and Bonneuil and Fressoz (2016) agree that conflict over resources is a historic reality and is predicted to worsen under increasing scarcity. The impact of such conflict is often multigenerational, with social, political and environmental impacts that extend beyond the event itself. The social and historical regimes paired with the struggle for scarce natural resources are influencing factors for environmental conflict (Narchi, 2015). Homer-Dixon in his 1999 book *Environment, Scarcity and Violence*, predicted South Africa to experience environmental violence over resource scarcity in the future. Lee (2016) describes Environmental violence as the following: i) the violence between people(s) over natural resources; ii) environmental policies that can be violent against people; iii) the secondary violence from the natural world as a result of human degradation of the earth and iv) direct damage to the environment by humans. Homer-Dixon (1999) proposes that any kind of scarcity can result in violence. This thesis brings together the concept of slow violence put forth by Nixon and environmental violence by Homer-Dixon and includes indicators of slow violence, such as civil unrest, as other ripple off effects of environmental degradation and violence, and resource scarcity. Civil unrest and environmental degradation are both indicators of slow violence as their growth is incremental until the situation escalates to more obvious identifiable forms of violence. The four ways in which Lee (2016) describes environmental violence are explored through the questionnaire and in the analysis of the factors leading to the water crisis. The accumulation of these slow violence indicators leads to the larger scale violent reactions that were documented over the course of this research.

Violent conflict, socio-economic stress, and societal instability result when human security is confronted by environmental change (Homer-Dixon, 1999). Thus, it can be concluded that climate change is a threat multiplier rather than a direct reason for violent conflict (Scheffram *et al.,* 2014). Across varying geographic scales environmental violence exists; therefore, a form of violence experienced on a global scale is climate change. Consequently, every person is a victim of environmental violence as well as a contributor to the creation and administration of violence toward the environment (Narchi, 2015). Responses and reactions to climate change can also be forms of violence either in the form of the conflict itself or structural violence. Climate change will mean that naturally occurring dry periods may manifest into deadly prolonged droughts.

Drought can be considered a chronic form of a natural disaster that has many social, emotional and financial effects on communities, families, and individuals (Albrecht *et al.,* 2007). The long-term environmental degradation and the psychological effects of drought are understudied. Drought consequently is a cause of distress across multiple domains such as workload, community attrition, isolation and financial security (Albrecht *et al.,* 2007). According to Albrecht *et al.,* (2007), droughts in the future will become another anthropogenic form of violence, which is important to consider in the context of this research. Considering the Cape Town water crisis, the demand management strategy of ''Day Zero'' induced reactions of panic, stress, impulse buying and stocking of water according to Walton (2018). Psychological and emotional responses like distress and anxiety can lead to Solastalgia, a concept put forth to provide clarity to distresses which are environmentally caused. Albrecht *et al.,* (2007) describe Solastalgia as

> "the pain or distress caused by the loss of, or inability to derive, solace connected to the negatively perceived state of one's home environment. Solastalgia exists when there is the lived experience of the physical desolation of home. Environmental change can create distressed environments inhabited by distressed people." (pg. 96). 'Solace' in this context relates to both psychological and physical contexts (Albrecht *et al.,* 2007).

Research aim and objectives

Against this background, the central question that motivates this research is to describe how Cape Town citizens have experienced or enacted acts of environmental violence as a result of the recent water crisis. This research secondly intends to discover if this drought triggered citizens to feel "Solastalgia" and furthermore to deduce what their opinions are as to the cause of the crisis and the future of Cape Town's water supply. A variety of Likert-type scales, open-ended, rating scale and multiple-choice questions were used.

Objectives:

1. Investigate the perceptions of the security, informal workers and law enforcement who monitor the spring, to understand their take on the violent conflict and their role in it.
2. Investigate if this group attributes climate change to have influenced the severity of the drought and understand their predictions for the future water crisis.
3. Evaluate the psychological, physical and financial impact of the drought on this group.
4. Identify key indicators for “Solastalgia”.

Climate change is a hazard multiplier and for South Africa, which is highly reliant on surface water resources, the increase in evaporation rates, drier conditions and more erratic rainfall will diminish our reliance on these supplies. Paired with these climatic predictions the status of water infrastructure and service delivery fails to adequately supply water in quality and quantity. Corruption and mismanagement and environmental degradation threaten the national security of South Africa. This decrease in water yield for the City of Cape Town threatened the very functioning of the city and these types of drastic changes to daily living severely impact the business, household and individual levels. These changes induce reactive behaviour in response to the drought, and when threatened to not be able to have access or supply of a vital resource, violent conflict is a likely outcome considering these circumstances.

The rest of the thesis is organised as follows; Chapter 2 investigates the methods used in this research to investigate the water crisis and gives historical and geographical context for the Newlands Spring. Chapter 3 explores the conceptual framework of this research and the literature reviewed for the study, diving deeper into the multiple factors contributing to the crisis. Chapter 4 describes the violence documented at the spring as well as the public response to the water crisis. Lastly, Chapter 5 considers the literature and the evidence produced through this research and makes the case for various forms of environmental violence as a result of the water crisis.

Chapter 2

Methodology

Using the Cape Town Water Crisis, an example of extraordinary water scarcity, as a proxy for predicted future climate change impacts, this study investigated the forms of violence that have led to it and that shape responses to and experiences of it. For this study, I chose the Newlands Spring as my case study site. The Newlands Spring has a complicated cultural history and with its relocation, it has gained more media attraction. Additionally, there have been instances of civil violence, with an arrest made late January 2018 following a physical altercation which made the local news realms. There have been several more arrests made throughout 2018 which have not made local news media.

The Group Areas Act of 1950 set the scene for the continued segregationist land policies under the National Party's Apartheid regime. Newlands is one of the many areas where black and 'coloured' residents were forcibly removed as these areas were declared for whites. These black and coloured communities were relocated to the outskirts of the city, where access to and quality of services were of a much lower standard. These types of natural facilities are not found in the areas of resettlement, meaning that these communities' connection with this natural resource has become restricted and pre-requisites for access are required, such as transport. Access to nature can nurture a connection to nature, the Newlands Spring is located near the Botanical Gardens, Newlands Forest and Devils Peak meaning that access to this spring results in access to other natural and cultural resources. Consequently, with proximity equalling in access to nature, it would develop a stronger connection to nature for the white population. Whereas the black and coloured community were deprived of this experience in the Newlands.

The Newlands Spring was relocated from the Newlands Brewery property to 700 meters down the road, next to the Newlands public pool. The new location of the spring provides parking spaces and allows for easier monitoring and access to the spring. Although the provision of parking is a blessing for water collectors this space was initially used as a parking lot for the shops, salons and restaurants which are only a few meters away from this new spring location. Additionally, Springs Way spring, a much-loved historic spring located a few blocks away on Kilder Road, has also recently been closed due to increased noise and traffic congestion as the spring was located at the end of a small quiet road, which houses an old age home. People have been collecting at the Newlands spring and Springs Way spring for the duration of the past century. It has been one of few places in Cape Town where the people from all walks of life interacted and diversity was embraced in the simple and humbling act of collecting water. The spring falls under common pool resources which are not privately owned and

freely used by the public. However, access to the spring is dependant on meeting certain social criteria which mean that certain communities cannot exercise their right to this resource, which is a form of structural violence. The spring's location is discriminatory to previously disadvantaged communities and its access is that of privilege. Nonetheless, the pressure and efforts of the locals put on the City of Cape Town had resulted in the Springs Way spring being shut down completely.

Figure 1: Location of Newlands and Springs Way Springs (Google Maps, 2018).

This kind of research needed to gain a perspective of the lived experience of the water crisis and how it impacted the population of Cape Town. Considering the multiple ways humans have inflicted harm upon the surrounding environments, I have investigated how the Cape Town water crisis has resulted in lived experiences of environmental violence and how our perceptions of water have changed with this associated distress. Restall and Conrad (2015), through their research, explore how people form relationships with nature through their experiences in it and how these relationships in turn influence certain attitudes and perspectives. They theorize that experiences in natural environments have a direct influence on people's mental, physical and overall wellbeing, this is attributed to the benefits

which are gained through the positive experiences and the contact with nature. These experiences have been documented to have intense ramifications on people's emotional response which can develop a deeper commitment to a personal or shared interest in defending the environment (Restall and Conrad, 2015). This, in turn, can foster better environmental management practices that are more widely adopted. Furthermore, the study sort to understand what had encouraged people to collect water, what were the emotions associated with this engagement in nature and how did it influence their perspective of water. What also needed to be understood by this study is; how distress, which was caused by a natural disaster, influenced people to behave and if negative emotions still encouraged people to have an interest in defending the environment.

The Environmental Distress Scale (EDS) developed by Higginbotham is a social impact assessment tool measuring environmental distress experienced by people who are residing in places that are being transformed by disturbance, it, therefore, measures how developmental and environmental concerns impact on wellbeing (Albrecht *et al.,* 2007). The Environmental Distress Scale aims to deliver a guide for the bio-psycho-social cost of development activities which lead to environmental degradation; this scale can be adapted to measure distress in the context of droughts (Higginbotham *et al.,* 2007).

Environmental distress is determined by Higginbotham *et al*., (2007) as a four-stage process: 1) People observe transformational environmental events and recognize the magnitude of the event. 2) They perceive this change as benign or as a threat to their well-being. 3) They experience the impact of the environmental change across various interrelated spheres such as economic and social disturbances, emotional reactions, physical symptoms and potentially the psychological response of ''Solastalgia''. 4) People further evaluate the threat and initiate coping behaviours (this can be either emotion-focused or action-based) and subsequently adapt to this new environment (Higginbotham *et al.,* 2007). Therefore, in this study the four-stage process is shown in Figure 2 and is elaborated as follows: 1) The City of Cape Town observed the successive dry years which was the transformational event and subsequently recognized the intensity of the drought. 2) The drought was considered as a threat to the well-being of the Cape Town Metropolitan. 3) Residents of Cape Town experienced a change in water availability which impacted on economic functioning; created social disturbances such as added traffic congestion, noise pollution, heightened feelings of distress and anxiety as well as adopted changes to their daily routine. The drought produced very strong emotional reactions within those affected by it. Social media-induced moral panic about water, the fear tactics applied in the Day Zero media campaign impacted many residents and their behaviour in supermarkets, water collection points and online were evidence for this panic.

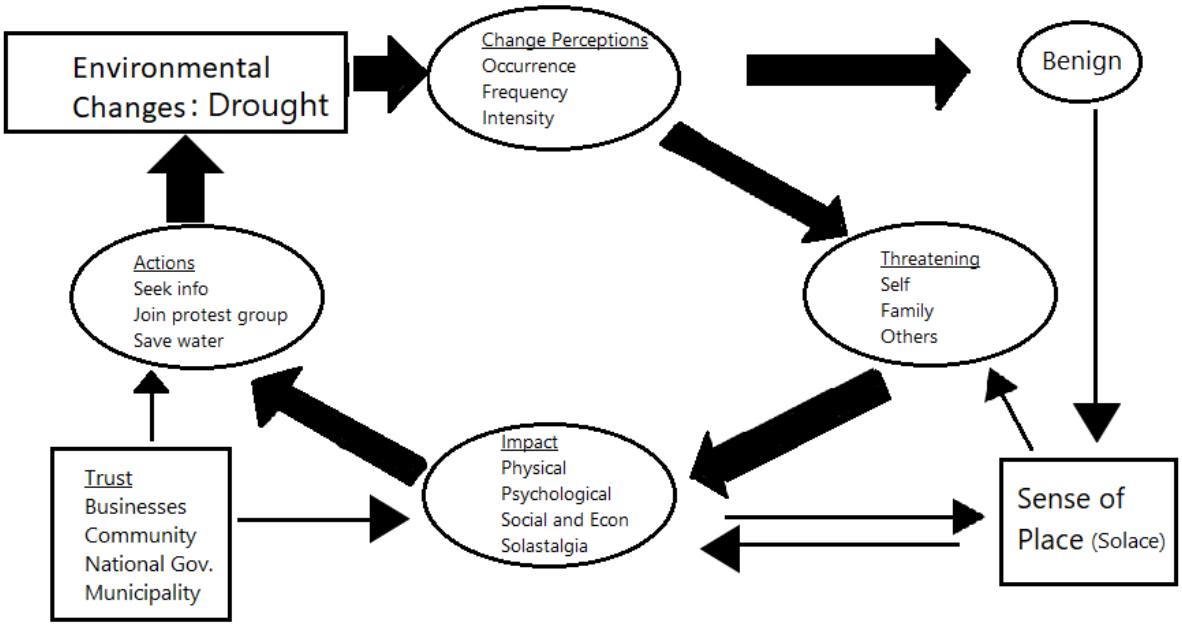


Figure 2: Environmental Distress Responses for Cape Town based on Environmental Distress Responses diagram by Higginbotham et al., (2007).

The EDS was comprised of several items which measure environmental distress components and the bio-psycho-social cost of the drought based in the study conducted by Higginbotham *et al.,* (2007). These items range from 1) *observations of hazard* (e.g., soil erosion, resource scarcity, fires, closing of public spaces, forms of violence to water systems), 2) *threat to self/family of drought hazard* (nonlife-threatening), 3) *performance of environmental actions* (reduced daily water usage, recycled greywater, collected spring water, participated in community meetings), 4) *felt economic impact of drought* (increase water rates, cost of water-saving techniques, cost of supplementing household water), 5) *felt impact of environmental change regarding emotional, psychological and physical symptoms* (heat stroke, increase levels of stress, injury related to carrying of water, anxiety, violence), 6) *impact to social and community function* (deterioration of community spirit, increased social tension, increase in community cooperation, civil unrest). Under what conditions such as i) heat, ii) time of day, iii) traffic, iv) water collection duration, v) ease of water collection process, affected levels of tension, stress, and anxiety? The EDS was a suitable tool to use in this study as its design made it flexible to apply to different scenarios of distress as well as comprehensively covered different aspects of the bio-psycho-social impact of the distress.

With the intense threat of becoming the first major modern city to run out of water undeniably distress was experienced by the four million residents of Cape Town. This distress is important to understand because of the long-lasting psychological impact it has on those who are experiencing a huge disturbance to their water availability (Higginbotham *et al.,* 2007). By identifying causes of

distress related to different ways the drought impacts these citizens future responses to water scarcity may be handled with better communication and water management practices carried out routinely and effectively. This scale was applied in the questionnaires and interviews used to conduct qualitative research. For one month, where one week was dedicated to the interviews and three weeks were dedicated to the questionnaire process over the last week of September and the first weeks of October. One hundred residents completed the questionnaires, one security officer was interviewed as well as three water helpers (who are both permit holding and informal workers who help at the spring). An example of the questionnaire can be found in Appendix 1.

Semi-structured interviews were conducted to gain the perceptions of the security guards, by chance there were also law officials who came to collect water. Officer Ngalonkulu was present when the physical altercation between a female security guard and a water helper occurred during the period of the data collection. The security officer and the three water helpers who were interviewed agreed to have their interviews recorded on-site and transcribed thereafter. Both the questionnaires and interviews were analysed to identify common themes relating to violence, household behaviour, earth stewardship, and community cooperation. The collection of the qualitative data was done through random sampling of citizens who collect their water at the Newlands Spring by conducting a public questionnaire. The True Random Number Generator application was used to determine who shall be chosen in the queue to partake in the study (if the person agreed to participate). Understandably some people were interested in my research due to natural curiosity and so in accepting these self-determined members of the public so there was some level of acceptable selection bias. The analysis of this data is a combination of quantitative and qualitative data, the importance of this is that it ensures that there is a balance between the strengths and limitations of both types of data. Although a statistical analysis would draw together a simple picture of the experience of the drought, the qualitative data collected paints a much more in-depth understanding of the variety of stressors felt by water collectors and how this type of environment can be conducive for conflict and civil unrest.

Limitations to this study

The primary main limitation of this study is based on the methodology of selecting participants since interested citizens were included in my study despite the random count selector, thus there is some bias in the study group. The second limitation is the reality that what people say and what people do can be entirely different and in the context of a study such as this, participants may have answered questions differently had they not been standing in the queue for water. There may have been some degree of social pressure present where participants felt as though they needed to sound like water

conscious collectors. Thirdly to collect water, certain socio-economic restrictions need to be met. Water collectors need to live close enough to spring to be viable to transport water home or have transport to do so. Additionally, they need to have access to water containers, and the physical strength to move them, must have access to spring either by working, living or shop nearby – which is not a reality for large sections of society. In terms of the study, it is representative of the rest of Cape Town, it was beyond the scope of this study to do a comparative study in poorer, less-resourced areas.

Ethical considerations

Sensitive research, although difficult to conduct, is important for investigating emotionally difficult topics that are often possibly destressing and personal for participants in the study (Fraga, 2016; Melville and Hincks, 2016). If research is not conducted with an awareness and sensitivity for the subject matter and the emotional implications for the participants, they may become revictimized (Melville and Hincks, 2016). Therefore, although ethical guidelines cannot advise on the unpredicted difficulties in conducting sensitive research, ethical guidelines are used to assess and mitigate these risks (Melville and Hincks, 2016). Creating an alias identity for the security guards is one way of reducing possible risk, yet most importantly, the questions need to ensure that it is not implicating them in allegations of environmental violence. Considering this fact, I commit to abide by the University of Cape Town research code of conduct.

By adopting the EDS from Higginbotham *et al.,* (2007) the causes and responses to this multifaceted water crisis can be studied in more detail. The environmental distress response articulated by Higginbotham *et al.,* (2007) and the concept of “Solastalgia” by Albrecht *et al.,* (2007) correlate to the observations made by Homer-Dixon and so by modelling the water crisis on the Environmental Distress Response model the opportunities for tension between the government and the public can be identified, evaluate the emotional-focused and action-based responses to the threat.

Chapter 3

Literature Review and Conceptual Framework

Why the need to view environmental crises as forms of violence?

In a world of increasing temperatures, changing ecological systems and processes, growing tensions between social and political groups, mass civil unrest, increasing populations and natural disasters; the incidences of violence (in all forms) are expected to rise. Thus, it is likely that violence or conflict will be increasingly influenced by environmental factors both directly and indirectly. The state of the environment has been disregarded for profit, yet in the age of climate change with increasing levels of poverty, migration and natural disasters (Strang, 2004; Bonneuil and Fressoz, 2016) these cases of environmental violence need to be looked at more critically.

The need for this study stems from the lack of a deeper understanding of how environmental degradation and scarcity play an influence in generating violence, whether that be violent conflict or slow violence (Nixon, 2011; Bernauer, Böhmelt and Koubi, 2012). Slow violence is less documented than violent conflict due to the nature of slow violence. The literature which does cover slow violence is limited too, showing that this area of research needs to be investigated more. With the onset of climate change and more social groups becoming adversely affected by changes in environmental conditions, the issue of accountability will be questioned with greater intensity. There is a consensus that developing societies are the most likely groups to have instances of civil violence occurring because of environmental scarcity, as they are more dependent on these environmental resources and are less resilient to the social crises such as severe social stress within the country caused by environmental scarcities (Homer-Dixon, 1999; Nixon, 2011; Bonneuil and Fressoz, 2016). Environmental scarcity interacts with other contextual factors to generate violence; hence, environmental scarcity is never the sole factor in incidences of violence (Homer-Dixon, 1999). Two forms of violence, structural and environmental, are the two forms that my thesis will focus upon, based on the theoretical grounding of Homer-Dixon's resource scarcity theory, explained further in this Literature Review.

Environmental scarcity

Two groups of arguments dominate the thinking in environmental scarcity: Neo-Malthusian and Cornucopian which present opposing views (Homer-Dixon, 1999; Bernauer, Böhmelt and Koubi, 2012). The former group propose that security is directly threatened by environmental changes due to their likelihood to intensify resource scarcity. The Cornucopian argument acknowledges that human well-being may be periodically at risk because of changes in environmental conditions, yet through a

combination of technological innovations, market mechanisms, and social institutions, humankind can adapt to these resource scarcities (Bernauer, Böhmelt & Koubi, 2012). As shown in Figure 3, violent conflict is induced by a type of scarcity which results in either of the two types of social processes determined by Homer-Dixon (1999).

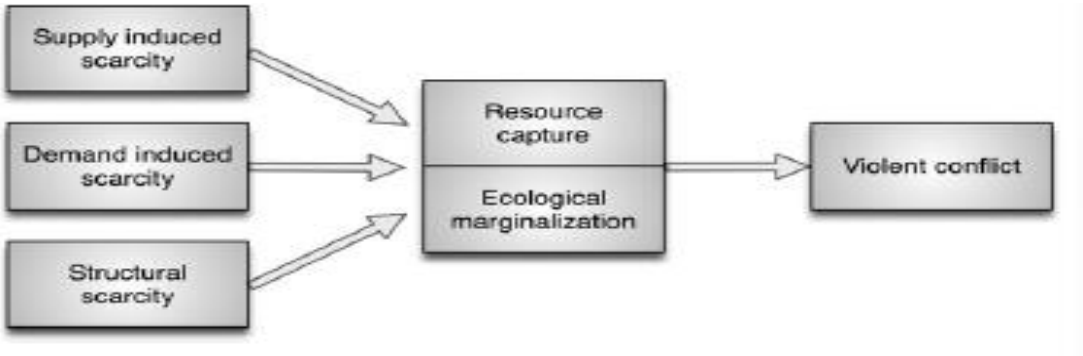


Figure 3: Environmental Scarcity and Violent Conflict (Homer -Dixon, 1999).

In thinking that all environments whether natural, urban or a mixture, are socially constructed has meant that these two different schools of thought can both justify environmental scarcity simultaneously. These arguments do not place social relations underlying resource use at the forefront of their thinking thus they neglect to see how the issue ''of scarcity is constructed and how a problematic framing might exacerbate scarcity conditions'' (Mehta, 2011; pg. 61). Mehta (2011) puts forth three major problems with this conventional definition of water scarcity, A) Conventional definitions fail to adequately differentiate between limitedness and scarcity as well as the scarcity of access. B) The projections for future demand are based on current usage behaviour, therefore, it cannot account for changes in the norm. C) As water supplies are exposed to external factors determining an available supply of water is challenging. Whereas Mehta (2011), theorizes that people in power ''naturalize'' water scarcity by attributing modern problems to natural turns of events, thus defining this scarcity as 'constructed'. In opposition to this is the 'material' scarcity that occurs at the biophysical level. There are a naturalist/materialist and humanist binary that characterizes the school of society and resource scarcity. As Mehta acknowledges the inherent complexity in determining water scarcity and places an emphasis on the social relations related to water use, this approach has subsequently been adopted in this study.

There are three orders of environmental scarcity which Homer-Dixon identifies (a) Supply induced scarcity (First order), (b) Demand induced scarcity (Second order) and (c) Structural scarcity (Third order), see Figure 3. Natural variation, pollution, ecological degradation or failure of infrastructure delivery which influences the availability or supply of the resource describes supply induced scarcity (UNEP, 2012). Demand induced scarcity occurs when the supply of the resource remains constant

whilst there is a growth in the demand. Structural scarcity is produced by low supply correlated with normal demand (Homer-Dixon 1999; Olofsson, 2017). These three types interact and reinforce each other resulting in two social processes 'ecological marginalization' where the access to resources is unequal in addition degradation and depletion are affected by population growth. Secondly 'resource capture', population growth and resource depletion produce unequal access to resources, to secure resources state elites may manipulate a country's policies in favour of gaining control of the resource (Homer-Dixon, 1999; Bernauer, Böhmelt and Koubi, 2012). Thus, weakening the institutional response and increasing the risk of violent conflict. The resource-deprived groups under such circumstances may move to areas which are ecologically stressed to meet their needs (Homer-Dixon, 1999). Homer-Dixon argued that frustration increases in groups when there is decreasing access to renewable resources, which will subsequently create grievances against the state thus weakening the state and civil society and ultimately growing the opportunity for civil unrest (Homer-Dixon, 1999; Bernauer, Böhmelt & Koubi, 2012).

There are 5 types of conflict arising from environmental scarcity which Homer-Dixon (1999) puts forth (1) Disputes arising directly from local environmental degradation. (2) Ethnic clashes arising from population migration and deepened social cleavages due to environmental scarcity. (3) Civil strife caused by environment scarcity which affects economic productivity and in turn people's livelihood opportunities, the behaviour of elite groups, and the state's ability to meet changes in demands. (4) Scarcity-induced interstate war and (5) North-South conflicts. He states that the fourth and fifth type is the least likely to occur. The first type of conflict is likely only to occur at the local level. Thus, the second and third type of conflict is what his book *Environment, Scarcity and Violence* focuses on as they are the most likely types of conflict to occur due to environmental scarcity. These three levels of scarcity are fitting for this crisis. Of the five types of conflict which Homer-Dixon describes, the most applicable to my research is the third type, civil strife caused by environmental scarcity.

There are five social effects occurring from resource scarcity which Homer-Dixon (1999) describes increasing the probability of violence, these effects are i) constrained agricultural productivity – which impacts mostly on ecologically marginalized regions, ii) constrained economic productivity – which mainly affects people who are highly dependent of environmental resources and who are ecologically and economically marginalised, iii) migration of affected people – in search of a better quality of life, iv) greater segmentation of society – often along existing ethnic cleavages and v) disruption of institutions – of the state.

Types of violence

Structural violence

Structural violence takes place when human action is constrained by structural forces, through the design of social systems (Scheffram *et al.,* 2014; Narchi, 2015). Colonialism, capitalist globalization, and neoliberal structural reforms have resulted in the inequalities and asymmetries of human experiences across the world (Scheffram *et al.,* 2014; Bonneuil and Fressoz, 2016). These are socially placed limitations on specific groups of people which hinders their ability to achieve a quality of life. These restrictions can be economic, cultural, religious, legal or political and normally stem from institutions of authority (Lee, 2016). The global south is disproportionately affected due to reasons such as poorer infrastructure, limited emergency response capacity and climate variability (Bonneuil and Fressoz, 2016). The reason structural violence is considered a form of violence is that the deaths and injuries which manifest from it are preventable, it is because of the way we have organized and systematized the world that results in deprivation and maldevelopment of groups in society (Lee, 2015 b). Increasing levels of poverty is characteristic of structural violence (Lee, 2015 b; Lee, 2016 a). Structural violence is often a central cause in other forms of violence, such as slow violence.

Environmental violence

An act of violence that is against humankind and the planet, is to destroy and degrade the natural environment. In turn, the natural environment has the greatest influence on human violence. Resource scarcity and overpopulation are considered obvious factors for environmental violence. Power (who has it and over what) however, is the matter which creates issues in society, the environment and violence are concerned with (Lee, 2016 a). Power, therefore, is the source of environmental violence as its manipulation of the political economy of the resource determines who will be deprived or profit from the resource access and use. Lee (2016 b) suggests that environmental violence is the result of and adds up to structural violence. Both scarcity and abundance can become sources of conflict depending on the bio-psycho-socio-environmental causation of violence (Lee, 2016 a). Consequently, the term 'resource curse' is an apt paradox. Unquestionably climate change is a form of environmental violence as it threatens all living organisms with the consequences unequally experienced.

Slow Violence

Slow violence is most associated with environmental violence. A definition coined by Robert Nixon, "a violence that occurs gradually and out of sight, a violence of delayed destruction that is dispersed across time and space, an attritional violence that is typically not viewed as violence at all" (Nixon,

2011, p. 2). Deforestation, ocean acidification, toxic pollution, and climate change are concepts of slow violence. The temporal and spatial consequences of slow violence are dispersed due to varying degrees of vulnerability experienced by societies and natural environments (Narchi, 2015). Qualities that environmental, structural and slow violence share is that they are invisible, subtle and accepted as a matter of course.

Water scarcity is a threat to the national security of South Africa as the impacts range from decreasing economic activity, declining agricultural productivity and increasing civil unrest. South Africa is characterized by a tempestuous past, therefore, the threat of violence ensuing from a resource scarcity is a foreseeable outcome. Rhino poaching, an ongoing violent conflict relating to environmental factors such as species decline and National heritage (Büscher and Ramutsindela; 2016.), provides additional evidence that civil unrest is a threat to National security. The effect of the drought can be considered to have been emphasized by the structural violence present in the systems of South Africa. The severity of the water crisis experienced in Cape Town highlighted the deeply entrenched inequalities between different racial and social groups.

Structural, Environmental and Slow violence

In the field of environmental violence, there are a few issues which have made it increasingly difficult to come to a consensus on the impact of environmental changes on conflict. Bernauer, Böhmelt and Koubi (2011) says the first issue is one of the coding of existing data. Existing studies do not identify explicitly if these issues in which violent conflict broke out over are directly related to changes in the environment. Secondly, data regarding the environment-conflict nexus generally uses high-intensity conflict events in large-N studies (Bernauer, Böhmelt and Koubi, 2012). Gaps in the literature which exclude less-intense instances of violence means that groups of people who are suffering remain unseen (Bernauer, Böhmelt and Koubi, 2012; Nixon, 2011). Additionally, the lack of inclusion of smaller low-intensity conflict events such as forms of communal violence, riots and demonstrations is a reason why current research cannot offer a deeper understanding of the types of changes in the environment that lead to difference of influences on various kinds of cooperation and conflict (Bernauer, Böhmelt and Koubi, 2012). By investigating what ways, the Cape Town water crisis can be described as forms of violence the focus in this study has included the slow violence indicators, such as signs of unrest in forms of civil disobedience and disturbances. This is research presents and interesting case to explore slow violence and environmental inequality in what can be called the “new normal” in the case of dry Cape Town.

Unrest evidence for the water crisis

Guckenberger (2018) provides evidence for two instances of civil unrest – an indicator of slow violence, taking place in the mid-1990s as a product of the neoliberal transformations to the South African water industry. The authorities began enforcing stricter implications to those consumers who were routinely not paying for water consumption, those whom were targeted would have their water access cut off. This enforcement resulted in violent protests between the connection teams and those cut off due to sustained non-payment. Subsequent actions from this termination of access resulted in illegal connections to access water by members of the community. Another instance of organized protests over water occurred in Tshwane Pretoria in response to the cross-subsidising water consumption for indigent Black residents in townships (Guckenberger, 2018).

More recently according to an article by the eNCA (a local TV media channel), an arrest had been made in late January at the Newlands Spring following a physical altercation which broke out because of rising tensions associated with water collections (eNCA.com, 2018). City security chief, Jean-Pierre Smith, added in the article that many noise complaints had been made regarding the collection of water at the Springs Way natural spring from congestion as well as from persons collecting water throughout the day and night (eNCA.com, 2018). Collection at the Springs Way was creating adverse impacts on the residents and the issue of congestion becoming increasingly frustrating (Chambers, 2018). The Newlands Spring when it was still located at the South African Breweries site; restricted operational hours and found it necessary to bring in additional security to manage the crowd after rising conflict. Conflict related to both the incidences of adverse emotional reactions and when people were taking more than the allocated amounts, this was deemed unnecessary by onlookers (eNCA.com, 2018). Smith had said that with citizens collecting far beyond what onlookers deemed unnecessary, the sustainability of the spring was becoming jeopardised (Chambers, 2018). Late-night crime has been an additional reason for the extra security and for closing the spring between 11pm and 5am (eNCA.com, 2018). The closing of the Newlands spring has been regarded as a sad closing of a historic spring. Philip Bam, Greater Cape Town Civics Alliance chairperson, expressed fear in a news article written by Isaacs (2018), that violence could break out as citizens started to become more aware that having to queue for water is fast becoming a reality. Bam stated that “I fear there will be frustration, violence, service delivery protests over water. People are going to say, ‘I don’t have water and it’s not my fault’” (Isaacs, 2018). Furthermore, cultural heritage in the form of both Springs Way and the Brewery Spring has been permanently removed from society which may lead to future disputes.

In early 2018, the Metropolitan Police and South African Defence Force had been prepared and were ready to be deployed at various points to prevent unrest which is an expected outcome as Cape Town, a city of four million people, was expected to collect their 50L daily ration from 200 water collection points (eNCAs.com, 2018). Tom Easton, a Columnist and Author, makes a comment in his article, ''*Cape water disaster: Help us if you can, we're feeling down…*'' (2018) that featured in TimesLIVE regarding the psychological impact of water scarcity. He states that

> ''Cape Town is already deeply anxious: anger will follow. And I don't mean entitled peevishness. I mean the stuff that sees people on collection lines getting stabbed or trampled, or petrol bombs thrown at police lines. Water is a primal need, and primal emotions are being triggered''.

The background to the water crisis.

According to the South African Weather Service, 2015 and 2017 were the two driest years on record in the region since 1921. The Western Cape system reservoirs in 2015 recorded an inflow of 54 percent of average whilst in 2016 the inflow average was 66 percent (Muller, 2018; Walton, 2018). In 2017 this dropped to around 40 percent. In peak summer of 2018 dam levels were below 10 percent (Muller, 2018; Walton, 2018), this record low dam level can be seen in Figure 4. In the first year of the drought residents dealt with the dry conditions negatively with demand rising by 9% (Walton, 2018). As of March 27th, 2018, the collective stored amount of water to supply the Western Cape was 21.7 percent of its normal levels (City of Cape Town, 2018). To curb demand and to encourage heavy water users to change their behaviour, tariffs were introduced. These tariffs showed a substantial shift in the pricing structure of water and were introduced as of 1 February 2018 with the restrictions moving to level 6B (Guckenberger, 2018).

Figure 4: Theewaterskloof Dam (Google Images, March 2018).

The Western Cape Water Supply System is made up of six major dams which contribute to 99.6 percent of the volume in the system. The Theewaterskloof Dam, the source of Cape Town's drinking water and farm irrigation became the icon for the water crisis (Walton, 2018). A warning system that notifies the municipality when dam levels are below normal levels for that specific time of year, has been the strategy for the City of Cape Town water management (Olivier, 2017). With the growing pressure on the City of Cape Town to provide alternative solutions for water supply, both desalinization and groundwater resources were investigated, however, according to Guckenberger (2018), neither groundwater nor desalination plants at the time could supply the city with enough water to maintain its consumption behaviour.

What this drought did expose was the incapacity of the system to cope with droughts of this magnitude (Walton, 2018). Despite being aware of the vulnerability of the water supply system, expansion did not occur at the planned date, leaving an unexpected crisis like this one to become devastating. The Department of Water and Sanitation stated in the early 2000's that by 2015 the Cape Town water supply would need to be reviewed and additional sources added to the supply network to meet projected population demands (Olivier, 2017). The quick and effective action from the city in implementing a water demand management strategy meant that the deadline for expansion was delayed to 2019. The strategy consisted of leak detection, free plumbing services to impoverished households, pressure management and water meter replacements (Olivier, 2017).

The pressure management that was implemented during the crisis saved thousands of litres of water per day and although that was effective in terms of saving water it meant that households water pressure was drastically reduced further complicating the issue of access to water. Receiving municipal bills that in the thousands even hundred thousand Rands was not unheard of, as Hendricks (2019) describes in his article for News24 where an unemployed single mother not only received a R220 000.00 municipal water bill but also had her water practically cut off from her home. Upon investigation by Collins (the homeowner), she noticed that even though the stopcock to the house water has been switched off the water meter still registered water usage. She complained that the municipality had not done a thorough investigation as to where the leak was, which turned out to be on the municipal side (Hendricks, 2019). An outcome of this research showed that other residents experienced similar issues with their meters and the municipality overcharging. The respondents encountered further frustration, stress and financial burdens due to the implementation of the water demand management strategy. These frustrations varied from having to detect leaks and fix them at the respondents' own expense, having water flow drastically reduced, having water completely cut off from the municipality to receiving enormous water usage bills at month-end.

According to Walton (2018), the supply and demand projection for the Western Cape Water Supply System through to 2030 which was published in the Reconciliation Strategy Study in 2007 stated that under a high-growth scenario augmentation would be required in 2011, under low-growth scenarios the date was 2015. The role therefore of the Strategy Steering Committee (SSC) was to guide the region's response to the study findings (Walton, 2018). Another important conclusion made about the water supply system was that it was too heavily dependent on surface water supply, which is vulnerable to increasing temperatures in climate change scenarios. The SSC for years had been deliberating what would be the best way the best means and time frame for the expansion of the supply system to take place (Walton, 2018). The options suggested during the crisis reflected much of what had been proposed before the drought which varied from clearing alien invasive species, tapping into groundwater reserves, desalination, reuse of wastewater and diverting water from other rivers (Walton, 2018). The variable in the study which would ultimately decide the means and the timing of expansion as demand increase, as part of the problem of demand was the steady rise in the population of Cape Town. The Western Cape water supply system had ruled as to how water was to be used if these rules had been followed there would have been 10% more water in the system. Silting of channels, non-operational pumps and not clearing alien vegetation from catchment areas meant that

the overall yield of the system is decreased as a result of mismanagement, a lack of routine maintenance and long-term management which is insufficient and inadequate.

A sure lesson learned through this crisis is that the water supply system needs to become more resilient, governance needs to be strengthened and adaptive capacity developed (Bonthuys, 2019; Ziervogel, 2019). This can be achieved by expanding the water resources to ones that are more drought-resistant such as desalination and groundwater. Another option is water reuse and stormwater harvesting (Bonthuys, 2019). One of the measures for future water saving is the reuse of wastewater. Currently, only 8% of this water is recycled, providing a fruitful opportunity for water conservation (Walton, 2018). Improving the water supply resilience needs to be sensitive to the economic inequality of the Cape Town population (Wolski, Hewitson and Jack, 2018). Addressing the supply and demand relationship through a flexible management strategy will ensure that future disasters are handled in an appropriate cost-effective manner for water users. Wolski, Hewitson, and Jack, (2018), state that for this management strategy to be effective there is a need to improve "near-real-time monitoring of climate and hydrological conditions and a continuous risk-based assessment of a season's outlook. In that, forecasts must be considered as well as defensible statistical relationships between drought and possible global drivers, with clearly articulated uncertainties.''

What became evident was that only controlling demand for a booming city was an inappropriate measure as the city is reliant on rainfall for its water supplies (Walton, 2018). The crisis was perpetrated by a failure to respond or acknowledge the calls for help, wasteful expenditure in the Department of Water and Sanitation (DWS) as well over-generous allocations of water to agriculture (Olivier, 2017). This is evidence of the fact that the drought had more to do with politics than a decline in rainfall as this is part of the natural variability for the Western Cape region. With the onset of the winter period, it seemed like Cape Town has avoided the possible catastrophe for the 2018 year as reservoir levels rose with rainfall and snow cover. The donation of water which relieved some pressure for a short time was from the Groenland Water User Association, a farmers' group based in the Western Cape (Walton, 2018).

Now that 'Day Zero' has been indefinitely postponed and there has been an increase in rainfall the attention to water scarcity has diminished; the possible explanation as to where the focus is now is on the upcoming National Elections. The water crisis may play a significant influencer on the vote depending on the perception of the voter as to how the city dealt with the crisis. Our relationship with water-based more around a commodity, which detaches us from our appreciation and connection to

the natural world. Water conservative consumption is not practiced in major cities across South Africa and Cape Town is no exception. In a semi-arid country, which frequently experiences extended dry periods our water use practices do not consider this scarcity or climate change in water management. Our water storage is exposed and our reliance on rainfall further exposes South Africa to periods of surface water scarcity.

October 2018, Gosling (2018 a) stated that water consumption levels rose to 546 million litres per day following the easing of water restrictions. In the months succeeding the peak of the crisis, recent concern has again been expressed by the City of Cape Town and has since advised citizens to be conscious of their water consumption. This concern is regarding the rise of water consumption by which is in April 2019 is 609 million litres per day yet remain within the target of 650 million litres per day (Coct.co, 2019; Evans 2019 a). Dams have seen a decrease in storage capacity of 1.2 percent; current levels as of 11 April 2019 were 49.1 percent (Coct.co, 2019). De Clercq, of the Water Institute at the University of Stellenbosch, predicted that Cape Town would go into the upcoming winter season (2019) with 45% capacity, further explaining that if ‘’if the winter of 2019 has bad rainfall, and the dams increase only to 55%, then you go into the next summer with lower levels – but you still need to take your 30% for consumption from those lower levels." (Gosling, 2018 b).

The politics of the crisis

Olivier (2017), describes how the water crisis has shown how complex the relationship is between the National Government led by the African National Congress (ANC) and the Western Cape lead by the opposition party, the Democratic Alliance (DA); as a result, local governments handling of the crisis has been debated despite the ‘effectiveness’ of the approach. The political discord ensuing from the drought has had the DA and the ANC blaming each other. The failure of the decentralized government system occurred at the National level of government; the City of Cape Town and the Western Cape Province prepared for the drought far beyond what was required of them according to Olivier (2017). The ANC has been blamed by the DA for not declaring the region as a disaster zone sooner as well as for not ensuring the adequacy of the water supply to the city – which in the constitution is deemed the responsibility of the National Government (National Water Act; Act 36, 1999) (Olivier, 2017).

In 2015 as the drought started to affect dam levels, the Department of Water and Sanitation did not try to curb agricultural water use, in fact evidence shows that the DWS allocated far more water than needed to agriculture whilst the city of Cape Town was allocated 60% of the water from the supply system (Olivier, 2017). A request for R35 million to be used to increase water supplies (by water

recycling and drilling boreholes) was rejected by National Government regardless of the low winter rainfalls in 2015 as dam levels were still 75% full (Olivier, 2017). The reason for refusal of this drought relief funding had more to do with corruption, mismanagement and debt in the National Department of Water and Sanitation, which meant that there were no funds available for drought relief resulting in a lack of action to assist municipalities who were pleading to be recognized as drought disaster areas (Olivier, 2017). If the DWS and other systems in National Government had been running effectively the Cape Town water crisis could have been mitigated and would not have reach the level of severity that it reached according to Olivier (2017) and Walton (2018). The DWS exceeded its 2015/2016 budget by R110.8 million due to wasteful expenditure (Olivier, 2017).

More recently, a draft plan for water supply and management has been released by the City of Cape Town, with the aim to ensure that the city's residents by 2040 are ensured safe access to water and sanitation, shared costs and benefits, efficient water use and diversified water sources (Knight, 2019 a). However well-intended this draft is, important elements are missing from the plan such as the uncertainty in future trends in economic activities, water demand, climate, population growth and infrastructure investments (Knight, 2019 a). According to Knight (2019 a), nationally 56 percent of wastewater treatment plants are not operating at their full capacity. Therefore, how is this failing system meant to deliver the promises in the draft plan without taking serious action to improve and manage water infrastructure? The water crisis in Cape Town is not the only water crisis experienced on South African soil, drought persists across the region with many small rural communities experiencing the daily struggle of not having enough water or adequate access to water – many communities in Limpopo have been without water for months, a limited few for years and those in Kimberly have their water turned off nightly (Cullinan *et al.,* 2019). Providing water to the residents of Makana Municipality (Formerly known as Grahamstown) in the Eastern Cape has, as of the beginning of 2019, been taken over by Gift of the Givers because the municipality has failed to provide water. The water situation threatened the closure of a major university (Evans b, 2019). This emphasizes the need for the National Government to make improvements and managing water infrastructure a priority.

With the implementation of the grossly increased water tariffs, water sales generated revenue of R4.4 billion (a 7% increase), although it is debated whether it is all profit (Knight, 2019 b). According to Moody, an international rating agency, the City of Cape Town's operations were only slightly impacted by the crisis over the 2017-2018 financial year as opposed to previous non-drought years. These billions in profit recorded due to this overcharging was justified by Deputy Mayor of the City, Ian

Neilson, by stating that without these increases in tariffs and water restrictions “we could have run out of the water and we could have run out of money” (Knight, 2019 b). However, the National Government would on no occasion have allowed the city to be in either of those predicaments as the disaster resulting from either of those outcomes would be far more damaging both in the short and long term. What is evident is that political parties are taking any opportunity presented by the drought to rally support and continue to use water as a campaigning tool for the upcoming May 2019 elections. Water is a political issue because it is an essential service that citizens often use to assess the performance of government at the local, provincial and national levels. This is assessment is mostly focused on the local government because its accountability is at the forefront of service delivery.

Impacts of the drought

The impact of the drought-affected the agricultural, tourism and business sectors. Roughly 7000 jobs in farm employment were lost in the peak of the drought in addition wine harvests declined by 15 percent (Knight, 2019 a; Walton, 2018). Tourism saw bookings decline 10 to 15 percent over the summer season, normally the peak tourism time for the region (Walton, 2018). The City’s international status as a tourist destination was slightly damaged by the threat of Day Zero and the strict water restrictions (Knight, 2019 a). There was a lot of misinformation as to the status of the drought by international tourists, some thinking that there were no water restrictions at all because the dams were 75 percent full (Gosling, 2018). Other recreational activities became suspended due to public pools being drained and park soil hardening, in the height of summer these types of social avenues heightened tensions as these public areas for recreation could not offer their previous joy. The cost of dealing with the drought has incurred an enormous amount which is set to rise depending on what happens with the winter rainfall. The costs of losses in agricultural production and jobs, reduced water revenue, a decline in tourism have amounted to R2.5 billion. What has been realized is that if investments in infrastructure had been made from 2013 to 2014, R75 to R500 million would have been paid in interest costs even if it proves to be an unnecessary expense (Muller, 2018). Although the economic impact of the drought is calculable, the effects on biodiversity and groundwater depletion are more difficult to measure and may take years to quantify.

Communicating the crisis

‘’Day Zero’’, became a term that evoked a sense of panic for the residents of the city of Cape Town. This panic lead to boreholes being drilled at unprecedented levels, citizens hoarding water from shops, queueing until late hours at natural springs to ensure that their household had water for their basic daily needs (Walton, 2018). Municipal workers made holes in sewer lines for low flows so that

underground water could seep in to compensate for these times (Walton, 2018). Notices about Day Zero had been plastered on any and every surface, airwave and bathroom, the campaign was pervasive, constant and effective. The significant push from the municipality calling on city residents to curb their water usage paid off and the impending Day Zero date was delayed but not before crisis mode had captivated the city. Water tariffs were increased, excessive users fined, and 46 170 water management devices were installed across the city (Walton, 2018). The most important and effective strategy was limiting daily consumption to a certain number of litres; moving closer to Day Zero this restriction became tighter with restrictions being their highest at Level 6 which was 50L per day. At each restriction level put in place, communication was released suggesting how the litre limit could be used to fulfil daily needs (Walton, 2018). See Figure 5 for posters on how to efficiently use the allocated 50 litres a day limit.

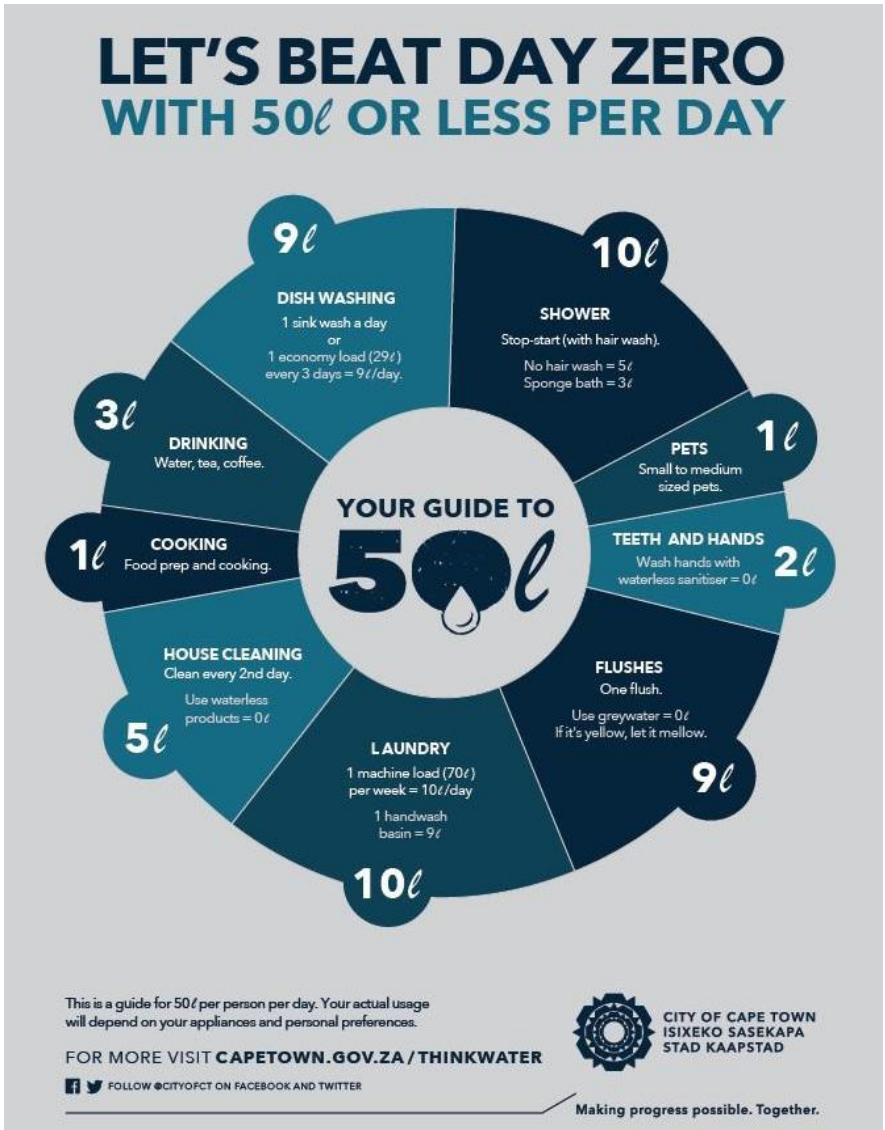


Figure 5: 50 Litre usage guide poster (City of Cape Town, 2018).

The City of Cape Town has received both credit and criticism as to information sharing and communication regarding the drought. The City has been highly praised in running a successful campaign which in a few short months managed to change domestic consumption patterns which resulted in Day Zero being delayed on several occasions to eventually being disregarded. The Municipality has been internationally recognized for its efforts and has set an example in how to address a water crisis. Data on the state of water resources had been made easily available through multiple sources (internet, print and broadcast media). However, highly relevant information such as data current rainfall and water use by different sectors is harder to access generally (Wolski, 2017). The gaps in the data information had somewhat been covered and supplied by individual sources aiming to give a more holistic picture of the extent of the drought and to predict the scenario for those upcoming months. It was of vital importance to predict the dam levels towards the next rainy season to make calculations for the seemingly inevitable Day Zero. Communication played a significant role in managing the crisis. Yet there were shortfalls in the seemingly successful communication. In no way at all was the communication effective in explaining as to why this crisis occurred to the severity that it did, nor to this day has communication been effective in conveying who would be held accountable for the crisis. Lastly, residents have not had adequate time nor a platform to raise their concerns and grievances with the municipality for the financial and psycho-social stress caused by a clear lack of governance.

The concept and consciousness of violence

In defining violence there is much agreement in the literature that it takes the form of physical, direct, intentional, socially observable, interpersonal and brutal action which the perpetrator believes to be a legitimate exercise of power and control over social or material resources (Scheffram *et al.,* 2014; Lee, 2015 a; Narchi, 2015).

Now more than ever is a need to change our behaviour to have some type of control over and mitigate our damage caused. This requires an awareness of the destructive behaviour when interacting with natural environments (Lee, 2015 a). There are three types of consciousness related to violence which Lee (2015 a) describes. The first type, a response that happens following an escalation of violence is called alarm consciousness. The second type, a lack of consciousness, is in opposition to the first and manifestations of this type are complacency, denial and the belief that violence is declining. The last type, studied consciousness, shows a new era of consciousness, one which has been studied and is developing an understanding of the violence and searching for means to prevent it. In studying violence, trends, patterns, and changes in time, other forms of violence can be identified. These

include structural and environmental violence. Therefore, the definition of violence is important. Lee (2015 a) states ''It also aids in recognizing the correct phenomena and in responding appropriately, as well as in guiding future inquiry; it can sharpen our understanding and ultimately change our consciousness'' (pg. 201.)

The World Health Organisation in 2002 defined violence as "the intentional use of physical force or power, threatened or actual, that either result in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment or deprivation" (Lee, 2015 a; pg. 201). The Global Water Security report in 2012 quoted that probable consequences of continued mismanagement are water terrorism and weaponized water, which can be mitigated by improving sustainability by improving water demand management (Guckenberger, 2018). Structural violence is a lethal form of violence that is caused by health and socioeconomic structures thus is a product of decisions made by our kind. A combination of psychological, social, biological, and environmental forces that are responsible for but are not to be made simpler by one another results in violence. Having characteristics like destructiveness and cruelty, violence has no adaptive purpose. Violent behaviour, which is to the detriment of humanity, as suggested by Lee (2015 b) is suicidal behaviour; climate change, this act of cognitive dissonance, which is detrimental to life as we know it, can then be considered influential for violent behaviour. Considering this statement Lee (2015 a) proposes a new definition of violence as ''The intentional reduction of life or thriving of life in human being(s) by human being(s), through physical, structural, or other means of force, that either result in or has a high likelihood of resulting in deprivation, maldevelopment, psychological harm, injury, death, or extinction of the species'' (pg. 202).

The Western Cape is characterized by a highly varying climate that is severely at risk to higher levels of unpredictability due to climate change. Three types of scarcity, environmental changes can produce conflict, yet it is not solely the cause of conflict. In the case of the Cape Town water crisis, the government and their failure to maintain water infrastructure have impacted hugely on the system's capacity to reliably provide water-related services. Corruption, mismanagement, poor planning and lack of capacity are key factors which have led to the degradation of water infrastructure. The Day Zero campaign was carried out on a huge scale, it targeted as many people as it could on many different platforms as possible to achieve the immense effect it needed (News media, social media, print media, word of mouth). It resonated and registered with many people; fear tactics were applied yet seemed necessary in their eyes having registered the severity of the event. Structural and institutional barriers producing tension between user groups combined with environmental degradation and a reduction in the availability of a vital resource creates an environment highly conducive to violence.

Chapter 4:

"Violence" induced by water crisis: the case of Newlands Spring.

The Newlands spring is in a middle-class suburb and so, therefore, those who collect water from this spring have largely been from the surrounding suburbs. Families have been collecting from Springs Way Spring and Newlands Spring for decades. The number and type of people who have recently started collecting water from the spring have changed with the onset of the drought; the spring saw water collectors come from areas further than the immediate neighbouring suburbs. The number of water collectors drastically increased with crisis mode; thousands of people came to collect at these springs per day. These spring sites and the queuing crowds encouraged the presence of self-proclaimed water helpers who tried to help consumers collect and carry water to the car. The water helpers who did not have permits (acquiring a permit required the said person to have an Identity document and to have applied with the City of Cape Town for such a permit - permits for the new spring location had not been released as of late 2018), often caused commotion with security, municipal officials and other fellow residents. The road adjacent to the spring experienced a great deal more traffic with the influx of water collectors. Due to the instances of civil unrest at this spring a metropolitan police container was planned to be placed next to the security hut to act as another form of protection as the security presence is not adequately trained to deal with incidents involving weapons nor the physical altercations themselves. The installation of the police container was quoted by the security to be the best management practice for safety this spring.

Public Survey

This section aims to illustrate the outcomes of a survey of 100 respondents using a questionnaire conducted at the Newlands Spring. The results will be broken into major themes (household behaviour, impact of the drought, earth stewardship, community cooperation, and violence) which were explored through the questionnaire based on Higginbotham EDS.

Household Behaviour

Water collectors were mostly male (63%) and in the age range of 30 to 70. Although collecting water is traditionally in South Africa a woman's task (Bloom, 2019), this research shows that this is not the case for this urban spring. Possible explanations for this shift in roles are that the activity of collecting water is very physically demanding on the body and so the males in the family take on this task as they may be more physically capable. Another possibility is that the males in the household felt that providing water, a basic need, became their role, taking the strain off the women as other household

roles became more complicated (presuming that the family structure is heteronormative). Furthermore, the dominance in male presence may deter many female collectors and with incidences of violence common in South Africa, it is possible women find themselves more vulnerable in this space. The most common household size was four people. More than half of the respondents said that they collected water from a spring before the 2017-2018 Water Crisis. The spring has long served as an urban source of alternative water, water collectors were mostly those who live in the residing sub-urban areas; however, with the crisis, the number of people who came to collect spring water increased by 50% and this increased the possibility of conflict and violence. The alternative water collection points were mainly Springs Way spring on Kilder road, St James Spring in Muizenberg and the S.A.B Brewery Spring and a spring in Vredehoek (which is the least formal of these listed springs). There was a range of answers for how long people had been collecting spring water, from over 25 years up to a month before the data collection period. Those who did not collect water before the water crisis mostly agreed (88%) that the water crisis made them feel compelled to collect additional water for their household. Other reasons for water collection for this spring can be found in Table 1.

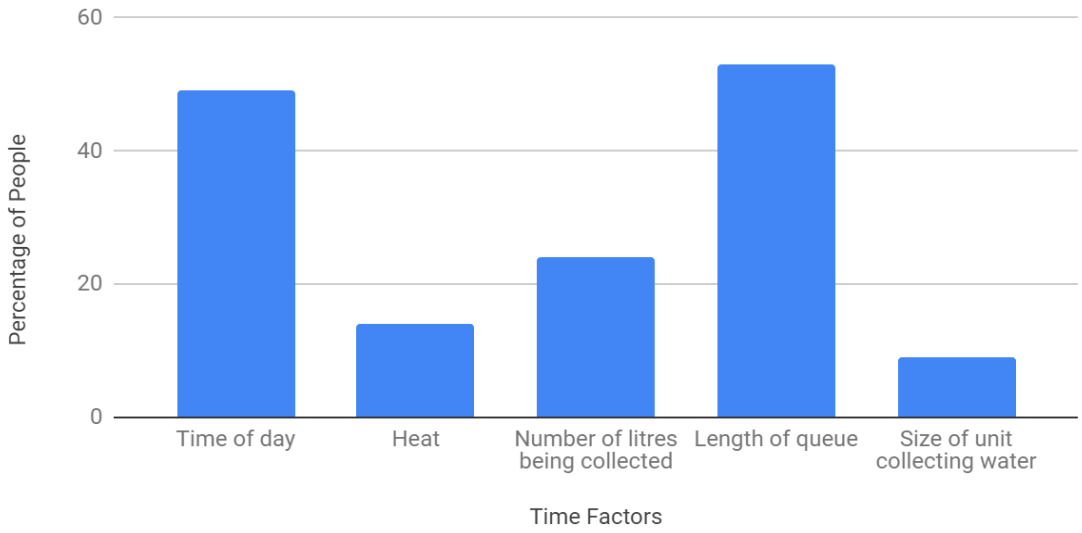
Table 1:The reasons for collecting water from the spring

Reasons for water collection	***Frequency***
To save water and money	6
Because the city has illegally manipulated the water supply to my house	2
Out of necessity	1
Just for the quality of the water	2

Respondents were given numerical IDs ranging from 1-100.

What can be gathered from this table is that people collect water for two reasons i) because they see the spring water to be of a high quality and ii) that people collect water from the spring because they felt the need to do as a result of the crisis. The frequency of water collection ranged from daily to once a month. The mode for regularity of water collection was once a week. Furthermore, 68% of the respondent's stated that it took them 30 minutes or more to collect water, often stating that it takes them more than an hour to collect their water. This time factor certainly acted as an aggravating circumstance and made people feel more frustrated with the entire water collection process. Graph 1

shows the various factors which increased the overall collection process for the individual and records how many individuals were impacted by the various factors.



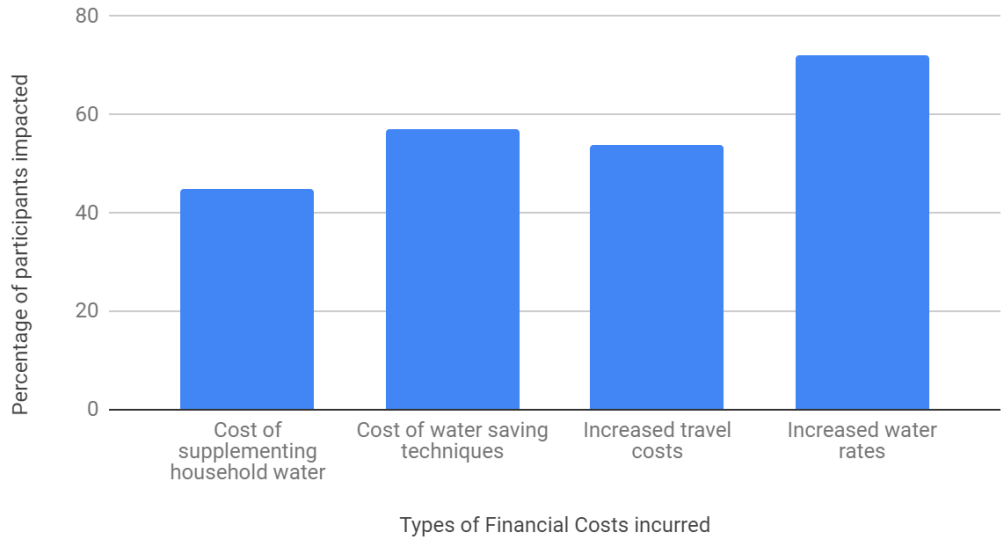
Graph 1: Bar graph representing the factors which increased the time taken to collect water and the percentage of participants whose water collection time was increased by these factors.

Impact of drought.

The experienced impacts of the drought were recorded in three aspects: i) emotional impact, ii) financial impact and iii) physical impact. In terms of i) From the figures in Table 2, it is apparent that Frustration, Stress and Connectedness to nature/experience were the most frequently felt emotions towards the drought.

Table 2: Emotional reactions to the drought

Emotional Responses	Frequency
Threatened Sense of Security	1
Fear	5
Dissatisfaction with government	6
Frustration	13
Anxiety	5
Stress	11
Sadness	3
Connectedness to Nature/experience	11
Shock	2
Other	3



Graph 2: Bar graph showing the financial costs to water collectors (Swain, 2019).

In terms of ii,) financial impacts to participants and their families, 41% of respondents felt that the drought had very likely had a financial impact, whilst only 3% of respondents felt it was very unlikely that the drought had financially impacted them. Graph 2 shows the percentage of participants who have been influenced by these varying financial costs over the crisis period.

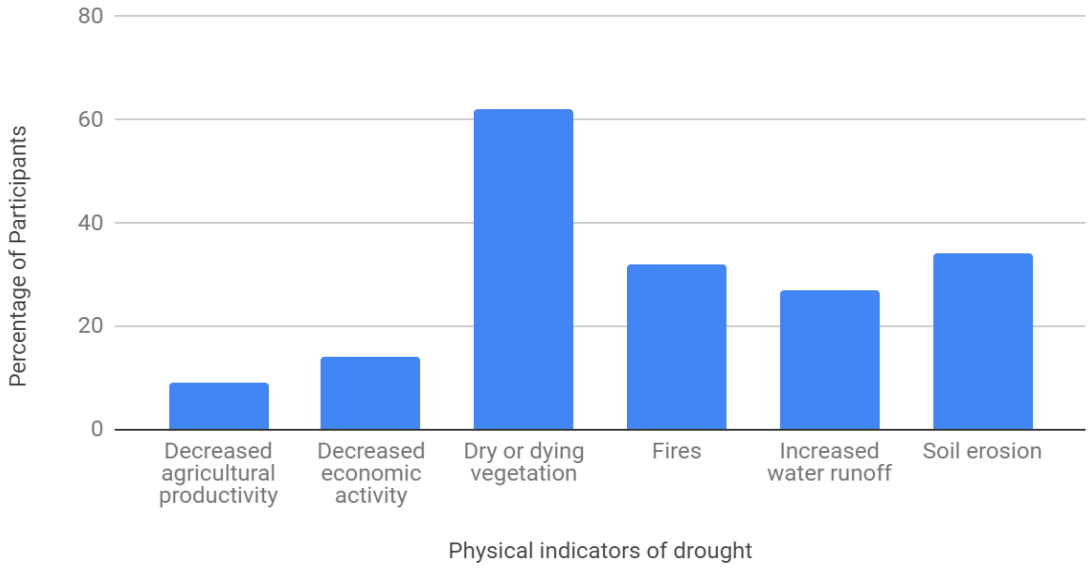
Lastly, the response for the iii) physical impact, of the drought, was relatively evenly split between those who had been physically burdened by the drought or not. The full list of responses can be found in Table 3. What can be deduced by this table is that physical strain accompanied by body aches was the most commonly experienced physical impacts of the drought. Secondly, there was a rise in medical costs for water collectors due to this physical strain and body pains. In terms of the threat of the drought to human life, 42% of respondents felt that the drought was life-threatening, if not for the whole duration of the drought but when the Day Zero narrative was most prominent in the media and the water restrictions were the most severe.

Table 3: Physical impacts of the drought (Swain, 2019).

Description of Physical impact of the drought	*Frequency*
Job strain	1
Physical strain/ physical exertion/ tiredness	15
Back ache/ sore back	11
Tennis elbow/ sore arms	2
Joint pain	1
Stinky/ body cleanliness/ hygiene	1
The time lost collecting water	2
The planning and commitment of time to come and collect water	2
Not having enough water for personal needs	6
Medical/ travel costs	2
Gained weight	1

Earth Stewardship

As a result of the media campaign of Day Zero, most Capetonians were very aware of the water crisis and had observed many different impacts of the drought. After this 43% of participants were very aware of climate change followed by 49% being aware of climate change, therefore overall most respondents were cognizant of climate change and its impacts. The results of the present study demonstrate that 57% of participants felt that climate change was very likely to have influenced the severity of the drought. Graph 3 shows what indicators of drought were most observed by the participants.



Graph 3: Bar graph representing the percentage of participants who observed these physical indicators of drought.

In response to water scarcity questions, 41% of participants considered water to likely be a scarce resource before Day Zero. Whilst 53% of participants consider water to now be a scarce resource. In terms of more visible effects of the drought, 69% of participants noticed the reduction in agricultural productivity and 72% of participants noticed the closing of public spaces. This affected 41% of participants, besides, the other public effects which were noticed by participants include the quality of fruit decreased, the film industry suffered, taps were dry at shopping centres, more people were experiencing stress as well as the additional cost of the drought which put a strain on the local economy.

There was a multitude of circumstances stated by the participants as to why the crisis occurred. Most circumstances described to have led to the crisis are centred around management (or the lack of), poor planning, increase in population and climate changes, which is shown in Table 4.

Table 4: Coded reasons for the circumstances leading to the crisis

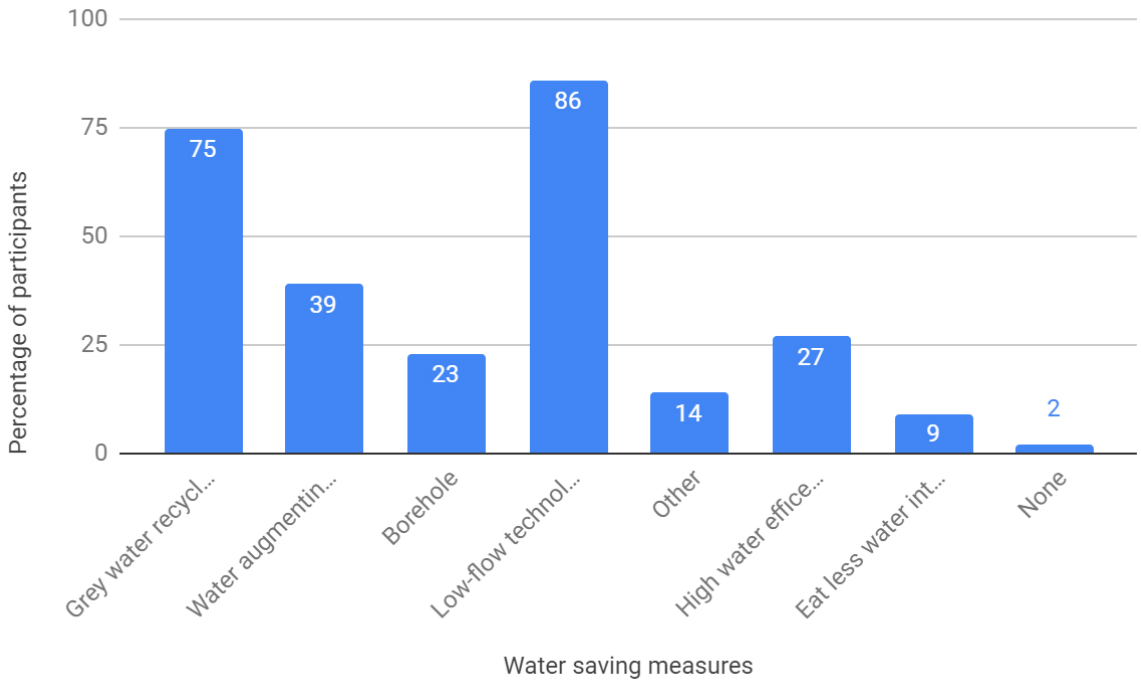
Code	*Frequency*
Bad Management	17
Climate Change	19
Human Behaviour	11
Infrastructure	5
Overuse	2
Pollution	4
Politics	6
Population	14
Poor Planning	12
Water Wastage	16
Resource Scarcity	2

Community cooperation

Most participants did not participate in community meetings or online forums related to the water crisis. The 27% of those who did participate felt that their sense of community was likely to have increased. In terms of the impact on social and community function and 48% of participants agreed that it was likely that the crisis strengthened their community spirit. And 58% of participants agreed that it was likely the crisis increased community cooperation. However, 58% of participants also agreed that it was likely that the crisis increased general social tension with 58% of respondents having witnessed civil unrest related to the water crisis. Whilst 56% had been a part of or had seen a disagreement taking place at the spring.

From the figures, it is apparent that 34% of participants agreed that the city's response to the crisis was effective whilst only 7% of participants thought it was very effective, 10% of participants strongly disagreed with the city's response. Many (42%) participants agree that water has been treated with respect over the crisis period. Over-use has been identified by 70% of participants to be the disrespectful treatment of water followed by water pollution (58%). Considering that most participants agreed that water had been treated respectfully, their actions in terms of water-saving reflected their agreement, Graph 4 shows the various water-saving measures implemented by the participants. The figures reveal that 51% of participants thought that violent conflict would be an outcome if Day Zero had happened. Table 5 lists the reasons given as to why conflict would be an

outcome.



Graph 4: Bar graph showing the percentage of participants who implemented the various water saving measures (numbers given on the bars present the actual percentage of participants).

What we can posit from this table is that varying combinations of these factors contribute to the likelihood of violence during the crisis. Under stressful conditions, the common human response is to behave in ways which are disruptive to cohesive living.

The results of the present study demonstrate that 42% of participants were unaffected by the presence of security. Whilst 55% of participants were unaffected by the fencing. Those who were affected preferred the presence of security for the safety and order which the presence of security is intended to provide. Whereas only 2% of participants elaborated that the fencing made them feel caged in and limited. And 48% of participants were unlikely emotionally affected by the relocation of the spring however the 7% of participants who were negatively emotionally affected by the relocation or closure. Overall 62% of participants collected water from Springs Way Spring and 85% were not consulted or informed in any way regarding the closure of this spring. Those who were emotionally affected by the relocation were mostly upset with the closure/relocation as there had been a long-standing relationship with the spring.

Table 5: Coded reasons for the possibility of violent conflict ensuing after Day Zero.

Code	*Frequency of code*
Desperation	2
Demand	3
Lack of Government control/planning	14
Resource scarcity	12
Panic	10
Fighting	26
Chaos	11
Positive human behaviour	6
Negative Human behaviour	22
Crime	3
Threatened sense of security	10

Interviews with informal workers, permit holders and security guards.

Informal and permit holding helpers work on a tip basis (food and clothes have been other non-monetary tips received). The permit holding helper, who has a permit for the Newlands Brewery but not for Newlands Spring described his job as to assist the disabled, elderly and pregnant to carry water to their cars, subsequently working at this new location he has witnessed lots of disabled people at this spring. These helpers are aware of the quality of this water and personally collect it from this spring as well. They regard water as valuable and worth saving.

Most workers have had prior jobs but for certain reasons find themselves making a living by offering their services at the spring, their services including carrying water cans to and from the car and standing in the queue. Some water collectors are selective of helpers, they make connections with the helpers who inform them when they can come collect at quiet periods. There is a shared perception from the helpers that their presence at the spring is often not wanted and that they cause discomfort at the spring, “they (the water collectors) despise you’’ (Informal worker A; 2018).

The informal workers acknowledge that they cause frustration by stealing cans and or lids or cutting lines, causing arguments (and at times physical altercations) to break out between water collectors. There are lots of arguments between helpers and people collecting and arguments between helpers and city workers. Additionally, ''people are not patient, and they fight with the security and helpers'' (Permit holding helper, 2018). The group is occasionally associated with one person's behaviour as some helpers come under the influence of drugs and alcohol and try to break the rules. The influence of drugs and alcohol certainly aggravates these circumstances of tension and maybe the reasoning for some of the physical altercations and incidences of petty theft. Pure desperation or opportunistic behaviour are other justifications for crimes committed during the crisis.

The male security guard oversees maintaining peace and order of the spring; if people are carrying weapons, he calls law enforcement and if there are no weapons, he will get involved in the argument to resolve it. He stated in his interview that ''trolley boys make the people fight by jumping queues, it makes the people cross. The helpers put down cans at one tap then leave to join the queue or go out and come back, they land up having about 5 taps.'' He has witnessed incidences of fighting (around 20 incidences), with the helpers landing up fighting as well. He has witnessed three people get arrested, one because he had an axe in his bag, one fought with security and there was a case opened at the police station and the third fight was between a helper and a female security guard.

The helpers feel that security is the worst job as they experience instances of disrespect. The incident which occurred on the 14th of November 2018 was between the female security guard at the gate, who was overpowered by a helper. The helper had come into the line with a 40-litre drum and she warned him that the container was over the limit and that he was not allowed in with such a large amount. He then threatened the security guard and once he had finished collecting water and moved out of the collection area, he started to physically attack her. Many of the other helpers jumped in to protect her and get him off her and proceeded to disengage this very quickly escalating altercation. Fortunately for this incident, there was a police officer who had come to collect water and he was on-site to deal with the altercation. Officer Ngalonkulu, who is a Metropolitan Officer[1], was collecting water, was present when the incident occurred, in his informal interview he stated that the man had been arrested and taken to SAPS Claremont where the female security guard laid charges. He also stated that ''there is always violence every day, there meant to be a law enforcement office here'', which the informal helper 1 further elaborated that it would go under the tree next to the security hut. Officer Ngalonkulu added that the fight will be a problem for the informal workers because the

[1] Metro Police act a supporting system to the SAPS who is the primary crime prevention unit in South Africa.

police will remove the workers without permits as it was an illegal worker who fought with the security and disrupted the situation. The helpers think that violent conflict would be an outcome if Day Zero had occurred had been a part of the small instances of violence in the spring already. ''People would have caused bloodshed, the whole of Cape Town collecting here…lots of violence if Day Zero occurred, lots of violence in a short amount of space. If Day Zero happened would need all the springs open and it wouldn't be enough'' (Informal worker A, 2018).

I posit that the presence of security, although it provides most people with a sense of security concurrently, poses a threat to others as their possibly over-abstractive behaviour at the spring. When one's sense of security is threatened, the natural reaction is to defend yourself from losing your opportunity to the resource in which you desperately need and so the threat to household and National security due to the water shortage had already seen people react to violence to maintain their access to this resource. The data obtained by this research demonstrates that violence would become the expected response and with the simultaneously failing governmental services (such as wastewater and sewerage systems) an ecological disaster on an unprecedented scale is on the horizon in the future.

In reviewing the data collected, it is obvious that there are many points of tension within the immediate environment of the spring as well as the activity itself. Citizens need to make additional plans in their day to set aside a timeframe to come and collect water, during the peak of the crisis it was impossible to accurately predict how much time it would take to collect the household water and other factors like traffic needed to be considered, therefore, it is easy to see how frustrating this activity became. The presence of the water helpers acted as a further point of aggravation (depending on the disposition of each resident on that day). These increasing pressures of frustration and stress infiltrate deeper into the lives of those collecting water as they are met with increased water tariffs and restrictions at home and work. Along with these pressures and the inundation of the Day Zero campaign, there were few avenues to release this pent-up frustration which meant that small normal clashes became escalated often finding justification through racism and classism.

The water helpers and the security all brought up the matter of being treated with disrespect by those who come to collect water from the spring. This speaks to the general atmosphere of the spring, that people are more concerned with collecting their needed rations of water than about the respect and dignity of other people within this space. As most participants said that they came to collect water for

their family, their actions are already centred around themselves and their families. However, the water helpers acknowledge that their behaviour is disrespectful too by jumping the queue.

Chapter 5:

Findings and discussion

Data collection occurred late into 2018 once Day Zero was avoided; whether that was a result of the citizenry's quick response to implementation of water restrictions and tariffs (Bonthuys, 2019; Krige, 2019). What this research has shown is that this drought is riddled with emotions of fear, anxiety, frustration and power struggles between the citizens of Cape Town and the City of Cape Town. Additionally, it has had an economic toll on both the local and regional, micro and macro scales. Tourism was largely impacted due to water restrictions, as did seasonal employment in the agricultural industry.

The drought had a widely felt economic impact at the household level. This increase in travel costs can also be attributed to the continuous increased in the fuel price for 2018, reaching a high of R17.08 per litre for unleaded petrol (Businesstech, 2018 a). Although a lot of the participants did not think that they incurred financial costs, there were subsequent unnoticed or unrecognized costs in the social, psychological and emotional personal realms such as time wasted whilst standing in queues, an increase in daily stress due to having to make time to come and collect water as well as a general increase in stress and frustration over the crisis period. This can also be attributed to the overwhelming crisis campaign. The structural violence taking place is that the residents to the Newlands and Springs way spring have lost their ability to collect water from these sites, a local socio-cultural tradition. For the residents in the area of Springs Way spring, this tradition has been put to a permanent end. For the Newlands Spring residents, their collection behaviour has been permanently altered by the employment of security. This has become a localized experience in a middle-class suburb, where water from the municipal supply is still provided. Yet for the residents of the informal sectors across South Africa, the structural violence taking place here with all the manifestations of inequality and poor quality of life in incomparable to this urban experience.

What was made clear by many participants is that the helpers or water carriers, who are making an informal living in the spring by assisting water collectors by carrying their water cans or standing in the queue for them; were a major point of tension for the new Newlands spring. The helpers disrupted the order of the queuing process by jumping the queue often, subsequently the fact that these helpers (who were mostly male) were trying to make a living enraged some participants as they became another point of annoyance in an already highly frustrating process.

The civil unrest observed related to the crisis included protests and arguments, shops also experienced an acute shortage of water. South Africa has had a history of supply shortages (from electricity, medical professionals, medical equipment and supplies to water). However, never has such a critical resource been in such a dire shortage. This shortage has affected the local economy in Cape Town with businesses having to alter their daily activities, bathrooms have been stocked with hand sanitizer instead of being able to wash your hands or flush the toilet. This had undoubtedly had an impact on health. The smart water meters, as well as the recognition of the fabrications of Day Zero, resulted in worsening relations between the state and residents amplifying previous water grievances (Guckenberger, 2018). Failing institutional capacity, mismanagement and poor maintenance of infrastructure and water resources are forms of structural violence consequently meaning that these forms are deeply ingrained in the system. The gradual increase in dissatisfaction and frustration with the government as they are unable to effectively plan and manage resources is an indicator of slow violence. The ineptness of the government is resulting in citizens feeling as if they need to take things into their own hands – such as Riaaz Rawoot who in his own time and using his own finances to install a tap system at the Springs Way spring to elevate the pressure of the crisis for those who collected from this spring. His installation allowed for 25 people to collect at one time and brought together the community.

Violent conflict, socio-economic stress, and societal instability result when human security is confronted by environmental change (Homer-Dixon, 1999). Thus, it can be concluded that climate change is a threat multiplier rather than a direct reason for violent conflict (Scheffram *et al.,* 2014). Therefore, in the case of the Cape Town water crisis the contributing severity of the drought by climate change has threatened water access and water security. Water access has in the past been a point of confrontation due to the grey area between the right to water and access to water. Even though it is a human right, it is not necessarily granted – which was a lesson learned by the Cape Town water crisis (Donnefeld, 2019). For millions of South Africans water security remains a cause of anxiety. The problem of low dam levels and low river levels are a reality for 9 of the country's 11 catchments (Donnefeld, 2019). High levels of poverty, unemployment, low levels of education and lack of service delivery are all contributing to the socio-economic stress and societal instability, these attributes already are enough to cause conflict. Human security and the security of the Western Cape were threatened by this environmental change as a result of a period of water scarcity.

The government is responsible for many forms of environmental violence, this resource scarcity is an obvious form of violence but so too is the millions of litres of raw sewage going directly into the

downstream Parys river. As is the toxic sludge and chemical waste disposed of into rivers and the ocean. The government is willing and intentionally poisoning our water resources and their lack of maintenance and management means that this water remains untreated and ever increasingly dangerous to consume (Cullinan *et al.,* 2019). Climate change, toxic pollution, increase in alien vegetation, silting of rivers, land degradation and loss of biodiversity are all indicators of slow violence which all in a multitude of interactive ways are threatening our fragile water resources. The attritional violence from all these types is likely to create the conditions for an apocalyptic type crisis for South Africa in the future.

Drawing on Easton's (2018) article, the Global Water Security report, the statement made by Jean-Pierre Smith (eNews, 2018; Chambers, 2018) as well Isaacs (2018), the evidence for possible violent conflict over water in the future is highly probable. Thus, supporting Homer-Dixon's theory that resource scarcity can lead to environmentally stimulated violence. However, the role of existing dissatisfaction with the government and existing inequality between racial and economic divides cannot be discounted as aggravating circumstances for violence. I henceforth put forward this new diagram, Figure 6, of Environmental scarcity and violent conflict first created by Homer-Dixon (1999).

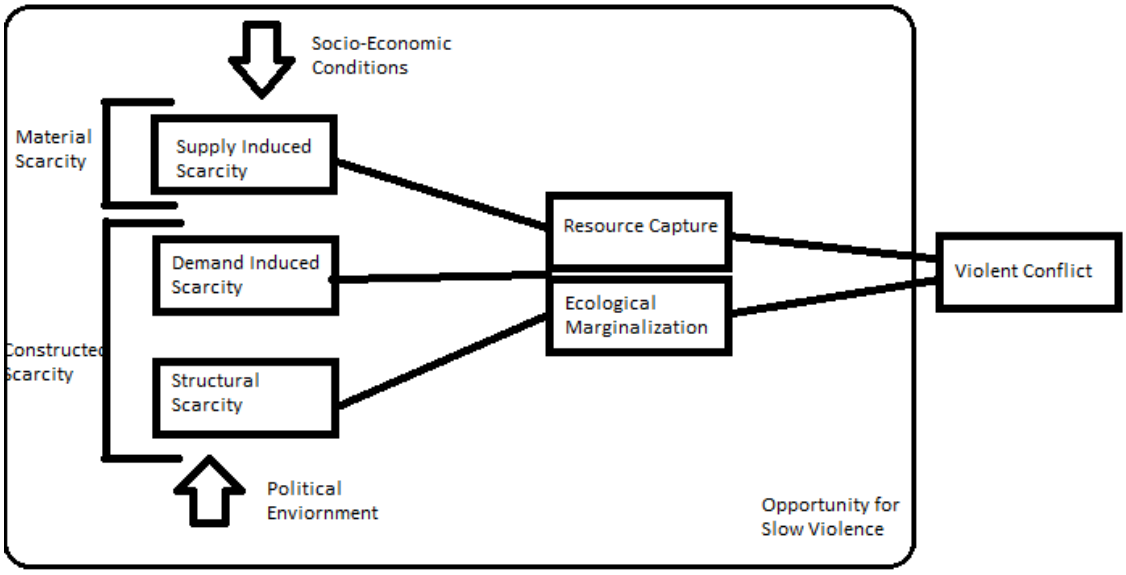


Figure 6: Environmental Scarcity, socio-economic and political conditions and the opportunity for forms of violence.

Conclusion

One of the main benefits of this study follows what Prévot *et al.* (2018; pg. 2), put forth which is that the experience of nature involves a process of interactions "between individuals and natural entities; social and cultural context; and consequences for new skills, knowledge, or behavioural changes", which are notably toward nature. By this definition, all kinds of experiences of nature relate to the implementation of pro-biodiversity practices (Prévot *et al.,* 2018). So, although a large portion of the participants felt compelled to collect water this activity nevertheless is still an experience of nature, thus, collecting water is a self-enforcing pro-biodiversity practice as people become more aware of the need to conserve and restore our natural common pool resources for water. In an article by Gosling (2018 c) she discovered that 82% of Capetonians would save more water under certain circumstances; those being if the government were to make more of an effort to solve the crisis and if there was better water-saving technology installed in their homes. This practice of water-saving has subsequent impacts for these water collectors as they are reminded of the plight for water conservation as well as the necessity to be aware of the state of the natural world which a lot of city residents are not so in tune with. These pro-biodiversity practices encourage others to assess their lifestyle choices.

The Cape Town water crisis has shown that the likelihood for violence to occur in future instances of resource scarcity is very high. The pressure to provide for one's family, the disruption to daily activities as well as the time and planning going into coordinating water collection has increased levels of frustration and dissatisfaction with government. More civil unrest will likely be experienced in the future if planning for a crisis of a similar nature mimics similar planning to this crisis. The increased financial burden experienced by some citizens due to the slow and incomplete repair work on the municipal property has further aggravated the relationship between the service provider and consumer. Thus, there has been little trust in the technical ability of government, and this was heightened with the release of the water board in early 2018 which tracked weekly water consumption for the city, dam levels and any increases in rainfall.

Day Zero would have resulted in a drastic change in societal function and once the realization that having to queue to collect water would affect other daily activities such as getting to work on time and living standards such as a decline in hygiene levels the panic and anxiety kicked in. It would have resulted in a massive disruption to the workforce productivity and parts of the economy would have come to a standstill further fuelling like the likelihood of violence breaking out uncontrollably. The fragmented system from a governance point of view means that the government (local and national)

is lacking the ability to view the system holistically and systematically address problems as they arise because the system is concurrently failing at so many different points (Green, 2019).

These types of 'rare' events will change to be a one in a 15-year event with climate change as opposed to the one in 50-year event pre-climate change conditions (Bonthuys, 2019). We need to expect many more events like this in the future. We need to expect a much higher level of unpredictability and our systems need to be more resilient, build more redundancy and responses need to be more rapid (Bonthuys, 2019). Ultimately, we need to change our perspective of what it means to live in a drought-stricken environment. Taking this into account we need to rethink our relationship with the cost of water. Cross-subsidising of water means that the true value of these services are not charged and it will prove to be a difficult path navigating a new municipal charging system, it is immensely important for this to be done whilst still making these services affordable because without pricing water in agreeance with its worth, our perception on the value of water will never truly reflect its invaluable role in our lives. Groups of South Africans continue to use more water than it can reliably harvest in any given year allowing this constant overexploitation to become our average levels of water consumption (Donnefeld, 2019). This emphasizes the need for the National Government to make improvements and managing water infrastructure a priority. If there is any lesson to be learned by this crisis is that if the infrastructure is not routinely maintained reaction time to periods of crisis become drastically delayed as the time it takes to invest and establish alternative options is incomparable to the time needed for these alternatives to be delivered. It has been proven through countless examples that the type of management of water resource management in place is failing at many critical points. Without simultaneously changing consumer behaviour as well as upgrading and investing in alternative water resources current status of water systems will continue to fail to provide security in times of crisis, whilst the intensity and the duration of the crisis period can be expected to become far more intense and volatile.

Additionally, there needs to be better communication from the government concerning crises in the future (Ziervogel, 2019). The Government needs to be able to know what data is available regarding water levels, the functionality of all pumping and storage systems as well as pressure management. Having all this data on hand response time can be quicker in all areas. The sooner conditions are known about our water usage and storage capacity the faster water-saving measures can be communicated and adopted in a manner which is less sudden and intense financially, emotionally and socially (Ziervogel, 2019). Hopefully, this will decrease the intensity and likelihood of violent responses. Furthermore, what needs to be considered and executed in a sensitive manner is a platform for the

citizenry to voice their grievances with the state relating to water issues so that there is a far more detailed understanding of what can be done better in the future and better implementation of water-smart technology, water restrictions, and tariffs. Hand in hand this platform and a visible change in government service delivery and water management need to take place. Power, therefore, is the main source of environmental violence in this study site and South Africa in general; the manipulation of the political economy of the resource determines who will be deprived or profit from the resource access and use. This power manipulation and jostling between the parties vying for centralized power means that the priorities of these parties are not focused on delivering on their services and commitments made to the citizenry and so water struggles will continue to plague the country's citizens.

The municipality has expansions planned for the spring in the future by adding another block of taps to the collection site to allow more people to collect water at any given time and to alleviate the lines in times of crisis. Maybe it will be this push that tips the precarious balance of the spring over the edge. If Day Zero is soon to be a reality, Cape Town is severely underprepared for the degree of chaos and disaster which will cripple the city. Saving water will continue to be contested between those who have no option other than to save and those who can afford to pay their way through their water overuse, and this may see violent responses from the former group.

Key findings from this research are firstly that it makes the case to explore slow violence and environmental inequality what can be called the "new normal" case of dry Cape Town. Secondly, the reversal in traditional gender roles of water collecting; this has influenced the dynamics of the spring location and possibly in the home too. Thirdly, the act of collecting water and communally experiencing this environmental crisis drew all kinds of people together in this unifying event. The interaction with nature and collecting water reinforced the need to conserve water. This study has contributed to the understanding of the impact of anthropogenically caused climatic events. It has presented findings regarding the psychological, physical, economic, social and economic factors felt at the individual level, which has cumulatively contributed to heightened levels of stress, anxiety, and tension. This generated a conducive atmosphere for civil conflict which has been documented by this research. Therefore, this research leads to the conclusion that "Solastalgia" is likely to be experienced by the residents of the city and this environmentally induced distress may in future times of crises influence behaviour to become far more radical and intense. The arguments given above prove that environmental violence has been experienced at the Newlands Spring and likely in the greater Metropolitan of Cape Town.

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Meagen Swain
SWNMEA001

Appendix A

Questionnaire

Section 1 - Demographic information

1. **What is your age bracket?**

◯ 0 – 20 ◯ 20 – 30 ◯ 30- 40 ◯ 40 – 50 ◯ 50 – 60 ◯ 60 – 70
◯ 70 and older

2. **What is the gender you identify with?**

◯ Female ◯ Male ◯ Prefer not to say

3. **What is your family unit size?**

◯ 1 person ◯ 2 people ◯ 3 people ◯ 4 people ◯ 5 people ◯ 6 or more

Section 2 - Water collection information

4. **Did you collect water at this spring before the water crisis?**

◯ YES ◯ NO

5. **If YES, when did you start collecting water from Newlands Spring?**

6. **If NO, did the onset of the water crisis force you to collect additional water for your household?**

◯ YES ◯ NO

7. **If NO, what is your reason for collecting water at the Newlands Spring?**

8. **Is this your only alternative source used? If no, please list your other sources.**

9. **How long does it normally take you to collect water?**

◯ 5min or less ◯ 10 min ◯ 15min ◯ 20min ◯ 30 min or more

10. How often do you collect water?

11. What factors increase your water collection time?

- ◯ Heat
- ◯ length of queue
- ◯ time of day
- ◯ number of litres being collected
- ◯ size of unit collecting water
- ◯ communication for open tap
- ◯ other

Section 3 – Felt impacts of drought

12. What are the emotional experiences you have had collecting water? (choice of 2 or 3)

- ◯ Joy
- ◯ Relief
- ◯ Stress
- ◯ Sadness
- ◯ Frustration or anger
- ◯ Fear
- ◯ Overwhelmed
- ◯ other

13. Did the drought feel like a threat to yourself and/or family?

◯ Non-life-threatening ◯ Neutral ◯ Life threatening

14. Have you noticed the drought had any of the following emotional impact on you and/or your family?

- ◯ Stress
- ◯ Frustration
- ◯ Fear or Anxiety
- ◯ Anger
- ◯ Joy or happiness

15. Describe your emotional reaction to the drought in the box below.

16. Has the drought impacted you and/or your family financially?

◯Very likely ◯ Likely ◯ Neutral ◯ Unlikely ◯ Very unlikely

17. Can you identify if any of the following reasons have financially impacted you?

◯ Increased water rates
◯ Cost of water saving techniques
◯ Cost of supplementing household water
◯ Increased travel costs
◯ Other

18. Has the drought physically impacted you and/or your family?

◯YES ◯ NO ◯ MAYBE

19. If YES, how has the drought physically impacted on you?

Section 4 – Observations of hazard

20. Are you aware of climate change?

◯ Very aware ◯ Aware ◯ Neutral ◯ Unaware ◯ Very unaware

21. Do you regard climate change to have influenced the severity of the drought?

◯ Very likely ◯ Likely ◯ Neutral ◯ Unlikely ◯ Very unlikely

22. What conditions do you identify to have led to the water crisis?

23. Did you notice physical indicators of drought?

◯ Soil erosion
◯ increase water runoff

◯ dry or dying vegetation
◯ fires
◯ decrease agricultural productivity
◯ decreased economic activity
◯ other

24. Did you consider water as a scarce resource before the Day Zero narrative?

◯ Strongly agree ◯ Agree ◯ Neutral ◯ Disagree ◯ Strongly Disagree

25. Do you consider water as a scarce resource thereafter?

◯ Strongly agree ◯ Agree ◯ Neutral ◯ Disagree ◯ Strongly Disagree

26. Did you notice any of the following public effects of the drought?

◯ reduction in agricultural and/or economic activities
◯ closing of public spaces
◯ other

27. Were you affected by this?

◯ Strongly agree ◯ Agree ◯ Neutral ◯ Disagree ◯ Strongly Disagree

Section 6 - Performance of environmental actions

28. Did you reduce your daily water usage? By approximately how much?

◯ More than half ◯ Half ◯ Quarter ◯ None

29. What water saving measures did you implement in your own home?

◯ Grey water recycling
◯ Borehole
◯ JoJo tank
◯ **Float Booster in Your Toilet Tank**
◯ **High Efficiency Water Appliances (dishwasher, washing machine…)**
◯ **Water-Saving Showerheads**
◯ **Low-Flow Faucet Aerators**
◯ **Eat Less Water-Intensive Foods**
◯ **None**
◯ **Other**

30. Did you participate in community meetings or online forums related to the water crisis?

◯ Frequently participated ◯ Occasionally participated ◯ Participated once ◯ Never

31. Do you feel that partaking in these events have increased your sense of community?

◯ Very likely ◯ Likely ◯ Neutral ◯ Unlikely ◯ Very unlikely

32. Do you think that some level of water restrictions should always be in place?

◯ Strongly agree ◯ Agree ◯ Neutral ◯ Disagree ◯ Strongly Disagree

Section 6 - Impact to social and community function

33. Did the crisis strengthen your sense of community spirit?

◯ Strongly agree ◯ Agree ◯ Neutral ◯ Disagree ◯ Strongly Disagree

34. Do you think the crisis increased community cooperation?

◯ Strongly agree ◯ Agree ◯ Neutral ◯ Disagree ◯ Strongly Disagree

35. Do you think the crisis increased social tension?

◯ Strongly agree ◯ Agree ◯ Neutral ◯ Disagree ◯ Strongly Disagree

36. Did you witness any civil unrest related to the water crisis?

◯ YES ◯ NO ◯ MAYBE

37. Have you ever seen or been a part of a disagreement over water whilst collecting from the spring?

◯ YES ◯ NO ◯ MAYBE

38. If yes, what has this disagreement specifically been about?

39. Does the presence of security at this spring affect you in any way?

◯ Very likely ◯ Likely ◯ Neutral ◯ Unlikely ◯ Very unlikely

40. Does the fencing of this area affect you in any way?

◯ Very likely ◯ Likely ◯ Neutral ◯ Unlikely ◯ Very unlikely

41. How does it make you feel?

42. At what point do you think we should stop considering water as a scarce resource?

- ◯ Never
- ◯ When the dams reach max capacity
- ◯ When the water supply system has been expanded
- ◯ Other

43. Did the relocation of the spring affect you emotionally?

◯ Strongly agree ◯ Agree ◯ Neutral ◯ Disagree ◯ Strongly Disagree

44. If the relocation affected you, why did it affect you and what did you feel?

45. Do you **think that the city's response to the crisis was effective?**

◯ Strongly agree ◯ Agree ◯ Neutral ◯ Disagree ◯ Strongly Disagree

46. How do you feel that water has been treated over the crisis period?

◯ With respect ◯ Some respect ◯ Neutral ◯ Slightly disrespectful ◯ Very disrespectfully

47. Do you identify any of these factors to be disrespectful treatment of water?

- ◯ Overuse
- ◯ Redirecting water courses
- ◯ Building on wetlands/flood plains
- ◯ Destruction of aquatic environments
- ◯ Water pollution
- ◯ Other

48. Do you think that violent conflict would be an outcome if Day Zero had happened?

◯ Strongly agree ◯ Agree ◯ Neutral ◯ Disagree ◯ Strongly Disagree

49. What is the reasoning for your previous answer?

50. Did you ever collect water from the Springs Way Spring?

◯ YES ◯ NO

51. How did the closure of the original Newlands spring/ Springs way Spring make you feel?

52. Were you involved/consulted in any way in the decision to close the spring?

◯ YES ◯ NO

53. What is it about collecting water that makes it a pleasant experience for you?

- ◯ The diversity of age, gender and race of people collecting water
- ◯ Being able to help myself/family to reduce our water usage
- ◯ The friendliness and kindness of the people collecting water
- ◯ The opportunity to be outside
- ◯ Other

Is there any opinion of the water crisis that you would really like to voice on this platform?

Thank you so much for participating in my study, I really appreciate your time and effort! Your data will be helping me answer questions about environmental violence and if the Cape Town water crisis has any evidence of it.